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Drawing in Elementary Schools.

THE Department of Science and Art has done well in issuing, for the first time we believe, an illustrated syllabus of the course of drawing organised by it for instruction in elementary schools. The principal value of such an illustrated syllabus is that it enables those of the outside public who are interested in the subject to understand better what is being done in this most important branch of elementary education. The necessary guidance for the teachers could be and probably is supplemented by more complete instructions; but the illustrations given in this syllabus put it in the power of all to obtain, at the cost of 4½d., an authoritative illustration of the official method of teaching drawing.

In a period of not much more than a generation we have seen a vast change in the ideas as to first education in drawing, both at home and in schools. The older ones among us can remember the time when Harding's "First," "Second," &c., drawing-books were the foundation for acquiring a knowledge of drawing; books in which the whole object was to produce picturesque effect and to acquire a picturesque touch; when everything selected to be drawn must be broken and dilapidated, the "first book" commencing with such examples as an old mile-stone, a broken stile, and such objects, shaded in lithograph. The next book would go on to more ambitious subjects—a bit of an old-thatched cottage with a penthouse porch over the door, a broom leaning against the wall, and a half-open window with the stirring incident of a jug on the window-sill showing up white against the darkness of the interior. Thus were put together the component elements in picturesque landscape sketching, and by the time the student got to the Fourth drawing-book he had risen to the copying of a whole lithographed landscape. The character of these little sketches was often admirable of its kind; but unfortunately the study of them, though possibly more interesting to the beginner than the present methods, did not teach drawing. It is only since a comparatively recent date that it has been generally recognised in schools and by "certificated" teachers that the first object in teaching drawing was to train the pupil to a steady command of the pencil and to a clear sense of line and proportion; and whatever faults may be urged against the "Department" system in its more advanced stages of art-training, it is only right to acknowledge that it is to its influence that we mainly owe the revolution in the preliminary teaching of drawing, which has consisted in substituting a specific training of the hand and eye for the old unsystematised practice of teaching children to sketch ragged objects in ragged lines, before they had even learned to draw a straight line or a curve with firmness and accuracy.

The syllabus is divided into three sections. The first gives the course of drawing in Elementary Schools and the schedule of subjects for examination. The second division is a scheme of instruction in drawing for small schools. The third is an alternative syllabus of instruction for elementary schools, to be used if preferred, and which differs in very important points from that laid down in the first section.

This first section, divided into seven standards, commences by setting the pupil to draw "freehand, and with the ruler," simple straight lines, crossing lines at certain angles, squares and continuations of squares. We do not quite understand the philosophy of doing these both freehand and with ruler; if the two are employed together it would seem to us that the ruler should come first, but the order of the wording seems to imply the contrary. We need not occupy our space with describing the standards categorically; they proceed from this onward to freehand drawing from the flat, drawings from simple models or everyday objects; and a note to the schedule makes the sensible remark that in order to interest the scholars in their work it is advisable to teach them to draw as early as possible from such common objects as are easily available. There is an exception made as to girls which seems unnecessary and unwise; they are not required to take the subjects specified in Standard VI. (*c*) or in Standard VII. (*d*) or (*e*). The first is "geometrical drawing more advanced than in Standard V.," the second "geometrical drawing more advanced than in Standard VI.," and the third is "plans and elevations of plane figures and rectangular solids in simple positions, with sections." These portions of the standards all deal with elementary geometrical problems—"to bisect a given angle," "to construct a triangle from a statement of one or more of its sides and angles," &c. Why should girls be debarred, any more than boys, from acquiring this degree of geometrical knowledge? It would be excellent training for their minds in any case; and in the present tendency to seek to enlarge the field of occupations open to women it is impossible to say that such training would not be of use to them in taking up some occupation in connexion with the arts or sciences for which they may have a talent, or in which they may find an opening. There is a point no doubt at which the education of the two sexes naturally divides into separate lines; but it is a point which is getting pushed later and later in their lives, and which in the present day can hardly be said to be definitely reached until the time when the future occupation of the boy or girl has been settled or can be foreseen with some probability. To make the break in what, even in its higher standards, is only elementary drawing, is a stationary, if not a retrograde policy. As to the examples of freehand drawing given, they seem to meet the case very well, and afford training to the hand and eye in a variety of lines and objects. We only complain that the specimens of shaded objects for Standard VII. (*c*), given on page 13, are poor things; the one at the bottom of the page looks like a bad imitation of Greek work. It is important that decorative objects set as copies should be such as to train the taste as well as the hand. Standard IV. deals with drawing things to scale, either by the eye (enlarging an object proportionately to three times the scale) or by actual use of the scale. There is no division here suggested between boys and girls, yet the reasons which prompted the division in Standard VI. and VII. might have been supposed to be equally applicable here. If drawing to scale is a useful acquirement for a girl, simple geometrical drawing should be equally so. We expect that these discriminations between the teaching of the two sexes will be abandoned in a future elementary programme, at no very distant date.

Section B II. is merely a system of grouping the scholars in small schools where the

average attendance does not exceed 60, and where the scholars may be divided in a junior and senior group, with two parallel lines of instruction adapted to their several capacities, and compressing the requirements of the usual seven standards into two. It is in fact a simplification of the system of Section I. for special cases.

The third section is on somewhat different lines from the syllabus hitherto in use, and is not intended to supersede it, but to be used as an alternative system for those who prefer it. It is however radically different at the outset, and seems to have been drawn up as a kind of concession to a feeling which has been rather prominent of late among educationalists (if we may coin the word), that elementary drawing should have for its object not merely training in drawing but training in the mechanism of the body, or the use of it; possibly also those who drew it up have been partly influenced by the attention which has been directed of late years to Japanese methods of drawing, with the sweep of the arm rather than of the hand. Instead of commencing with the drawing of straight lines and geometric figures, this alternative section commences with the drawing of complete curves, mostly ellipses, drawn at arm's length and with free action from the shoulder. A quotation as to the intention of this is given from the Education Department Circular No. 322 (February 6, 1893), to the effect that the teacher should aim at "the harmonious and complete development of a child's whole faculties," and should pay especial regard to the love of movement, which can alone produce healthy physical conditions. A page is given of first specimens, not as copies, but as examples of what children may be made to draw on this system; commencing with a simple ellipse drawn at arm's length, then to collocations of ellipses in such a manner as to produce a simple decorative result. This is excellent practice both for the eye and for the body; the instructions being that the ellipse should be repeated in different directions, to give control of direction, without turning the paper or changing the attitude. This is perhaps not exactly learning drawing in the strict sense; on the other hand it may be replied that it is learning something more than drawing at the same time, and something quite as good for the child; and at all events it is a far more genuine piece of training for hand and eye than that foolish drawing round the outlines of shillings and sixpences, which Mr. Ruskin and Mr. Leland have recommended as preliminary teaching in drawing. Other examples follow, with the application of this acquired power of drawing elliptical curves to simple objects in which such curves occur. Whether we should quite approve of elementary decorative outlines of birds, fish, &c., being produced by this means is another matter; to our thinking it is more desirable that learners should draw the genuine outline of birds and animals in the first instance, when they come to drawing them at all, and learn them aright, and learn to conventionalise afterwards; to begin with conventional representations of living things seems beginning at the wrong end, and starting the learner with false ideas as to natural form. Brush-work, after the manner of the Greek so-called honeysuckle ornament, is also introduced in this course, commencing with the simplest attempt at a symmetrical "dab" with the brush, proceeding subsequently to the grouping of brushmarks in decorative combinations. Drawing from memory is also introduced in this section. This is a very useful training to the mind and the faculty of perception, but in the case of beginners or young pupils it should always, we think, be preceded by the drawing of the same object from sight, so as to learn all about it on the spot, otherwise the memory-drawing may only promote a loose habit of drawing: we gather from the wording of the instructions that this was not intended to be specially insisted on. There is no reason either why memory-drawing should be made a part of the "alternative" scheme and entirely ignored in the normal scheme (Section I.); the latter includes drawing objects both from the flat and from the round, and memory-drawing could be just as well applied to those as to anything contemplated in Section III. Nor is there anything to prevent the normal scheme and alternative scheme being used conjointly, if the teacher wishes and if there is time for it.

On the whole, though some of the examples given as typical specimens of copies for study are certainly not all that one could wish, the general scheme as illustrated here seems fairly calculated to ensure that children with ordinary attention and care will learn by its means that power of handling the pencil, and of clearly appreciating form and proportion in objects, which has now at last been recognised to be such an important element in general education.

NOTES ON PRE-CONQUEST ARCHITECTURE IN ENGLAND

By Professor Baldwin Brown.

VIII.—*Roman or Romanesque? Summary.*

EVERY discussion on pre-Conquest architecture must have for one of its ultimate objects the establishment of something like a chronological sequence among the various types and styles of work represented in the monuments. A comparative study of plans has already enabled us to decide with tolerable certainty that cruciform churches cannot be prior to the tenth century, and that the earliest towers would probably make their appearance about the same time. Examining the monuments from the point of view of their structure and technique, we have inquired how far they show traces of Roman or Celtic influence, or seem to have been affected by the traditional methods of timber construction familiar to their builders. The following represents the outcome of these inquiries: (1) Except in the case of the basilican churches the proportions of the buildings are not Classical; the technique is not Roman; the only features that are avowedly Roman are the round arches and the plastering; the baluster-shafts and the peculiar bond called "long-and-short work" are probably ultimately Classical. (2) The square ends of the churches agree with Celtic practice, and may be derived from this source; the sloping jambs and the square-headed openings are decidedly of Celtic derivation; the steep slope of the gables points to the same influence. (3) Timber tradition practically counts for nothing in the stone churches. To these results it must be added that the remarkable height of the side-walls is not either Roman or Irish, but occurs on the Continent under circumstances suggesting that it was a means of protection against heathen assaults; that the extreme length of the naves in proportion to their width is not noticeable elsewhere, and may be claimed for the moment as a native Saxon feature.

If the above analysis—though put for convenience sake very shortly—is substantially correct, we may ask, How do the results of it help us in the matter of chronology? and to this the disappointing answer must be given that they do not help us at all, save in two points only: (1) the "long-and-short" quoining, which seems a late feature, and (2) the disproportionate length of the nave. The three longest churches known, Monkwearmouth, Jarrow, and Escomb, seem on other grounds to be among the earliest examples, and this length may, accordingly, be accepted as a criterion of date. All the other features, such as sloping jambs, baluster-shafts, and high walls and gables, occur late as well as early, while the technique of the masonry seems to vary from example to example, and district to district, but not from age to age.

One branch of inquiry now remains. We have to carry the comparative method from the consideration of plans and fabrics to that of ornamental details, and to ask how far Saxon mouldings, carvings, shafts, capitals, and similar features, can be fixed in time by a comparison with what is found in more or less datable buildings elsewhere in Europe. There arises at the outset the question—Roman or Romanesque? The history of the details and decorative features of Christian churches is parallel to that of their plans and construction. Almost every feature that we find in use in the Romanesque era actually had its origin in Roman work, but, instead of all these features continuing in vogue through the Early Christian and Early Mediæval periods, they seem to drop out of use altogether, and when they reappear it is rather as new creations than as revivals. This is the case, for example, with the cubical capital, which occurs in Early Byzantine work, but is hardly known elsewhere till it comes into prominence as a characteristic feature of German Romanesque in the eleventh century. The twisted column is Classical but yet characteristically Romanesque. The same may be said of the more important features, the angle-shaft and the roll-moulding, which in Romanesque recessed openings so constantly go together. The roll-moulding is Classical and occurs abundantly enough on Roman altars and tombstones, yet its real place as a predominant enrichment is in Mediæval and not Antique architecture. The angle-shaft occurs in a prominent position on the façade of the Palace of Theoderic at Ravenna of about 500 A.D., and, doubtless from a Byzantine source, in the Mosque of Toulun at Cairo of A.D. 877. Its use, however, all through the Early Mediæval period is merely sporadic, while in the advanced schools of Romanesque it becomes one of the most familiar features. The appearance of any of these forms in pre-Conquest architecture *may* mean that the Saxon builder employed a Roman or Early Christian motive which in the rest of Europe had been suffered to go out of use. It is infinitely more probable, however, that its use in England is contemporary with, or a little posterior to, its emergence into general favour on the Continent. "Romanesque rather than Roman," is the answer we should have to give in most cases to the inquiry noticed above, and this applies also to some other forms in regard to which the contrary reply would seem the most natural one to give. There are many imposts of Saxon tower or chancel arches that remind us at once of the mouldings on Roman monuments, and would naturally suggest an early date for the buildings in which they occur. A similar inference might, however, be drawn with almost equal justice about much of the linear ornamentation of the Normans, which we know as a fact was not in use before the eleventh century. The stars and zigzags, with which we are all so familiar, are almost exact reproductions of devices we find on ancient Roman stones, like the fine altar discovered not long ago at Lanchester, in Durham. The fact is that Roman monuments remained conspicuously in evidence throughout the Early Mediæval period, and were open to any one who desired to appropriate or to imitate them. Such appropriation or copying might be done at any time, and is, in itself, no valid criterion of date. A feature, therefore, that occurs both in Roman work and Romanesque may in the nature of things be early or late, but there should be little hesitation in consigning a comparatively late date to angle-shafts and large roll-mouldings, such as occur at Wittering (fig. 45), Bosham (fig. 46), Stow, or St. Benet's, Cambridge.

The same would be said with confidence about pilaster-strips and wall-arcading, did not the latter occur in the remarkable Saxon chapel at Bradford-on-Avon, that is generally reckoned an early example. Here we find on the outer faces of the walls, in a lower story a division by upright pilaster-strips, and above, cut out in low relief on the surface of the stonework, an arcading, in

which pilasters with bases and caps are joined by a series of round arches, after a neat and tasteful pattern. Now this arcading, if Romanesque, plain as it is, would not be pronounced rude or early, and would certainly agree better with the style of the eleventh century than

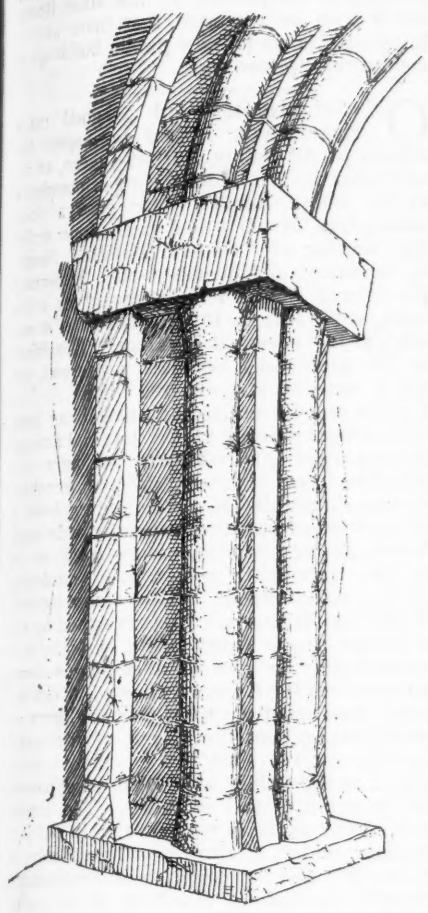


Fig. 45.—Chancel Arch, Wittering, Northamptonshire.

of the tenth. The same would be said of the masonry, the fine jointing of which seemed to Sir J. H. Parker like work of the twelfth century. Why not therefore, it will be said, assign it its date in the late period of the style to which these features seem to point? That we are not ready to do this is

Fig. 46.—North Pier of Chancel Arch, Bosham, Sussex.

due to the fact that other features of the building seem just as characteristically early. In plan, in proportions, and in the width of its chancel arch, it is very unlike the later type of Saxon churches. The north and south porches, of such large proportionate size, remind us of St. Pancras, Monkwearmouth, and Corbridge, rather than of anything of later date. They seem to be examples of the "*Porticus*," so often mentioned in connexion with churches in early Saxon records, the ecclesiastical use of which is not clearly known. Though the nave of the chapel is not of disproportionate length—it measures about 25 by 13 ft.—the height of the walls is extraordinary. They are nearly twice as high as the chapel is broad, a proportion never reached elsewhere, and though lofty naves, as we have seen, occur late in the style, the general tendency of proportions in the epoch of advancing Romanesque was towards the breadth and lowness that characterise the Norman style, and which are conspicuous in the late chapel at Deerhurst. The chancel arch is, however, the feature most difficult to reconcile with a late epoch. In a notice of early Celtic churches, in his "Scotland in Early Christian Times," p. 64, Dr. Joseph Anderson remarks about some primitive examples in the North of Scotland, that "no earlier type of chancel entrance is likely to be found than one which . . . . is not differentiated in any feature of size, construction, form, or ornament, from the external doorway." These words might almost have been written about Bradford, where the chancel arch is only 3 ft. 4 in. across, and is only a little wider and more ornate than the doorways. It is difficult to believe such a chancel opening could belong to an advanced period of pre-Conquest architecture. The date of Bradford-on-Avon, and with it the age of decorative arcading on Saxon churches, must, therefore, for the moment remain undetermined. Where such arcading occurs on towers, it is, of course, never of early date.

The results of the considerations advanced in the preceding papers of this brief series may seem meagre and unsatisfactory; but, in the present state of knowledge on the subjects dealt with, it has seemed better frankly to confess a doubt where uncertainty exists, than to attempt to fit all the facts to some pre-conceived theory. If there are still some who would go back to the old position that there are no Saxon stone buildings which can be proved earlier than the eleventh century, such must be reminded that the crypts of Wilfrid still exist at Hexham and at Ripon, and that his church at the former place lasted till it was burned down at the end of the thirteenth century. The workmanship of those crypts is not so unlike what we see at Corbridge and Escomb, and other sites in the North, that we find it hard to accept an almost equally early date for these and similar churches. Did nothing certain exist from this early period we should feel somewhat differently, but about the age of these remarkable crypts there can be no reasonable doubt; and they establish a probability in favour of the churches to which great weight must be allowed. Resting on this abstract probability, we may here offer a tentative chronology of some of the more complete or more remarkable of the Saxon churches, based on their architectural features only. In regard to many of these buildings, there exists a certain amount of literary material which must be taken into due account in fixing their dates. It cannot, however, be properly employed, except after critical sifting and discussion, for which there has been in these papers no opportunity. The difficulty nearly always arises, in the case of literary notices, that we are not sure that the buildings mentioned therein are those of which we have existing remains. The instance of Deerhurst contains a warning. An inscription had long been known, which describes the erection of an ecclesiastical building at that place in the time of Edward the Confessor. As Deerhurst Church was obviously Saxon, the inscription was supposed to refer to it, and its date was thereby held to be fixed. It is now seen, however, that the inscription does not refer to the church at all, but to another Saxon building the existence of which at Deerhurst had, till the other day, been unsuspected. In the case of Bradford-on-Avon, William of Malmesbury gives us a notice which would prove conclusively the early origin of the building, were we sure that the "ecclesiola" of which he writes is the same structure as the one we know. On the other hand, we can be certain, from topographical indications, that the Mediæval notice we possess of St. Pancras, Canterbury, refers to the existing remains near the Kent and Canterbury Hospital, while continuous tradition in the case of St. Martin's, at Canterbury, and the same (coupled with Early Norman work in the chancel arch) in that of Monkwearmouth, renders the current identification of these buildings indubitable.

Nor, again, has account been taken in these "Notes" of the occurrence of carved and inscribed stones in connexion with the buildings referred to. This class of evidence has its value, but like that derived from literary sources it must be used with due caution. Independently, however, of any light that can be derived from these two quarters, it is something gained to know what the purely architectural evidence gives us, and this appears to be the following. The basilican churches, about the age of which there is not so much doubt, may be left out of consideration, and the enumeration that follows refers only to the buildings on what we may call for brevity the Celtic plan.

Escomb heads the list of these, for it possesses every feature that we have seen reason to believe makes for age, and none that suggests a later date, save that the fact that it is not mentioned by Bede seems to place it after his time. Monkwearmouth and Jarrow would stand in the same category, but we cannot escape from the puzzling fact that although *ex hypothesi* erected by Benedict Biscop, they show—in form and *technique*, at any rate—no traces of that "Roman" or "Gallic" style which we should naturally look for. We can only remove this undoubted difficulty by the supposition that what the foreign craftsmen really paid attention to was the decoration and fitting up of the church, the fabric of which they built, or suffered to be built, in the style already established by the earlier Celtic missioners. Bradford-on-Avon has been admitted to be a point of uncertainty; but in the meantime we may be justified in dwelling more on the early features just discussed, than upon the apparently late arcading and the fluted pilasters. Apart from some other possibly very early examples in the North, it would be rash to suggest any additions to this list of churches prior to the Danish invasions, though some existing fabrics with high and narrow Saxon naves, such as St. Nicholas, Leicester, may go back to an early date. Corhampton, though it may be on a site consecrated by the preaching of Wilfrid, is marked out by its pilaster strips, and especially its north doorway, as being at least of the tenth century; while the enigmatical Britford has too wide a nave to be very early. The great towers, Earl's Barton, Barton-on-Humber, Barnack, Clapham, Wickham, and the numerous examples in Lincolnshire and on Tyneside, do not seem to possess any general features which would place them in the tenth rather than in the eleventh century. Finally, it is clear that wherever mouldings show considerable effort after effect, with an evident approach to Romanesque forms, it is the latter rather than the former date that should be preferred. Thus Bosham (in spite of its early associations, Wittering, St. Benet's, Cambridge, Stow, Worth, Norton, Deerhurst, Wooten-Wawen, would all fall in the later period of the style, and probably belong to the times of Canute or of Edward.

The above, as has already been explained, is tentative, and can only be of value in view of further investigations. The methods of study which will probably produce the best results in the future are the statistical and the comparative methods. The individual monuments have been pretty carefully explored, and we can hardly hope for

many more such new discoveries as those of Escomb, Bradford-on-Avon, and Earl Odda's chapel at Deerhurst. Portions of pre-Conquest masonry may, however, come to light in many quarters where the presence of such is now unsuspected, and any old village church, the nave of which is high and narrow, may be found to have as its kernel a single-aisled Saxon oratory.

What we require now is an accessible list of the known examples of Saxon buildings, which should be widely disseminated and encourage study in every part of the country. Such a list, with technical notes and drawings, all excellent as far as they went, appeared in every edition of "Rickman," until the last and current edition, in which, with excellent intentions but a deplorable result, it has been omitted. The consequence of this omission has been, that the one standard book on English Architecture as a whole, contains, as at present read by students, no notice at all of this extremely interesting period, which they are thus encouraged ever afterwards to ignore. The result may be judged from the fact that a work of the pretension of the new illustrated edition of Green's "Short History of the English People" could be issued to the public in 1892 with the amazing statement (vol. i., p. x.) that "the primitive Romanesque architecture of England before the coming of the Normans is now represented only by the little church at Bradford and by a few church towers!"

The first desideratum is an amended list, brought up to date and accompanied by measurements and by drawings of mouldings and similar features. A process of comparison could then be set on foot, not only among the monuments in question themselves, but between these and examples on the Continent. It is hardly too much to say that it is not in England that early English monuments can now best be studied. A patient search in those districts of France and Germany which are likely to have been most in touch with Saxon Britain, will bring to light parallels to many features which, as we find them on this side of the Channel, are unique, and therefore unintelligible. The plan of Wooten-Wawen, for instance, is unique among our known pre-Conquest churches, but there are examples in Germany of a tower over the choir with a sanctuary beyond, which seems to be the scheme of the Warwickshire edifice. An elucidation of Britford will probably be found in the same manner. If some of our local investigators, now pretty numerous, who are enthusiastic about Saxon churches, will spend their holidays on the Continent in exploring the village churches of likely districts across the Channel, the difficulties that still beset the study of this architectural period will soon be in a fair way of removal. That it is worthy of systematic treatment few will deny. Saxon buildings may not be artistically inspiring to the practitioner of to-day; they may not exhibit consistency in style, or present any clear picture of the evolution of architectural forms, yet they are instinct with a certain rude life and energy of their own, which are not without fascination for the student. One would say that the Saxon builders of the first half of the eleventh century bade fair to evolve a vigorous and independent Romanesque style. As we know their work, it is still in the experimental stage, but a glance at the chancel arches at Wittering and Bosham figs. 45 and 46), shows that it was at the same time spirited and strong. That work of such promise was never carried out to finished result is due to the Norman Conquest, and it casts a new light on that extraordinary event to know that it completely extinguished the nascent Saxon Romanesque. Except the square ends of the churches it would be difficult to find any characteristically Saxon features taken up into Norman architecture—for the western towers and square towers over crossings occur often enough on the Continent. Norman building in England may differ in certain respects from Norman building across the Channel, but the divergence is only slightly due to the surviving traditions of Saxondom. With what force must William and his followers have struck their blow, when it checked for a time so entirely the growth of Teutonic culture in a country that, after all, was destined to remain to after ages a Teutonic and not a Norman land!

NOTES.

TWO new museums were opened in Paris last week. One of these was that of the artistic collections of the City, for the present placed in the pavilion of the Champs Élysées, which will however have to be removed before the 1900 Exhibition. The large hall, divided by high partitions into compartments, is occupied from the surbase to the frieze by pictures, rather too crowded and somewhat hurriedly arranged. The collection as a whole is not exactly a model of an art-museum; the visitor is somewhat confused by the number of works of all kinds, from competition sketches and rough models of sculpture up to the last purchases from the Salons. If the scheme for the 1900 Exhibition is finally confirmed by the Government, this provisional gallery will be succeeded by a permanent building on the new avenue which is to lead up to the Invalides. The collection will then, one may hope, be better classified, sketches, &c., separated from finished works, and sculpture provided with a gallery of its own.

THE other museum just formally opened is the beautiful Musée Galliera, designed by M. Ginain, and of which we gave an illustration in our issue of January 6, 1894. The collection is in a very unfinished stage at present; with the exception of the fine tapestries from the Gobelins, Beauvais, and the ateliers of Faubourg St. Marcel, there are at present only a few things—enamels and pewter-work by Charpentier and Desbois, and some marbles, &c. It must be regarded as a museum in course of formation, and in a few years will probably be a very fine collection. But it is surely a singular and unhappy idea to have closed up the three bays opening towards the Square Galliera, under the mere pretext of giving greater wall space for the city tapestries. It is taking away one of the greatest beauties of the exterior design of the building, and nullifying one of the intentions of the architect, which was to present an open loggia towards the fine panorama of the Seine and the Champ de Mars presented from this point. It is to be hoped the "City Fathers" will think better of it, and restore the building to its original condition. What they have done is a kind of barbarism one would not have expected in Paris.

THE Budget for the financial year 1896-1897, which has been put before the Imperial Parliament at Berlin contains, as usual, a number of large items for public works, and it should be remembered that, besides this budget, which concerns the Empire as a whole, the different budgets of the individual States, such as Prussia, Bavaria, Saxony, also include considerable sums under the headings "architecture" and "civil engineering." The total for public works as estimated in the Imperial Budget is over forty-eight and a half million marks, or about 2,430,000*l.* Works under the supervision of the War Office require nearly 1,500,000*l.*, whilst the Navy requires 150,000*l.*, and the Post Office 230,000*l.* The Railway Department this year only requires 300,000*l.*, whilst the German Colonies are apparently to have 50,000*l.* The large items which have of late years so conspicuously figured in the Budget for the North Sea-Baltic Canal, the new Houses of Parliament, and the new Imperial Law Courts at Leipsic are no longer to be found in the estimates, the Canal only requiring 6,000*l.* and the Houses of Parliament 2,300*l.* The new Technical Research Institute, which will require a total of about 100,000*l.*, is however down for 20,000*l.* in 1896-97, and the equestrian statue to Emperor William requires 70,000*l* on account. The expenditure for the War Office is extraordinary in comparison to the other items, and it is to be regretted that there are no substantial sums for new public buildings of architectural pretensions.

ON Saturday the 14th a good many visitors were invited to inspect the church of All Saints, Norfolk-square, as rebuilt after the fire, under the superintendence of Mr. Ralph Nevill. We gave a short description of what had been done under the heading of "General Building News" in our issue of November 16. Externally the church is very plainly treated in brickwork, with only a little decorative stonework at the principal entrance. The fabric of the outer walls has been preserved, but faced externally with red brick. The Padouk wood from Burmah, which has been used almost entirely for the internal fittings, looks exceedingly well, and we may congratulate the architect on the excellent though simple design of the seating, both in an artistic and practical sense, the wide seats being sloped from front to back so as to be thoroughly comfortable, rendering cushions superfluous. The electric lighting is carried out after a scheme designed by the architect, single lights being hung by silk cords from the roof at a height of about 12 feet from the floor and covered by opalescent glass shades. The electric lights on standards, taking the place of the usual candles on the altar, have rather a novel effect, and possibly would not be approved of by some of the orthodox. The screen behind the stalls is treated simply but in a manner which is distinctly Renaissance in character; this introduction of Renaissance detail into Gothic churches is an architectural fashion of the day with which we do not entirely sympathise. The treatment of the front or "riser" of the chancel, towards the church, with the same mosaic with which the chancel floor is laid, instead of a stone retaining wall, is a detail worth notice, and has a good effect. It is intended, when funds permit, to erect a terra-cotta belfry and spire over the unfinished turret at the east end.*

THE first experiment by the Architectural Association in introducing papers by practical artisans at its meetings was so successful that there can hardly be doubt that the plan will be adopted from time to time. In the present case the meeting was in our opinion all the more successful in consequence of what at first seemed a disappointment—the unavoidable failure of the readers of the other papers which had been promised to keep their engagement. The result showed conclusively that a paper on one subject connected with building, by a practical artisan, was quite enough to furnish useful matter for discussion for one evening, and that if the two papers on woodwork and leadwork had been also read, there could not have been time for the proper discussion of any of the subjects. On any future occasion of the same kind it will be better to follow the precedent which was unexpectedly set at last Friday's meeting, and keep to one material or one class of work and discuss it thoroughly; though it might be quite possible, and in some cases advantageous, to have two short papers on the same subject from different points of view—say one treating of the material, the other of the manner of working it.

* We may add that the cost of the whole has been between 6,000*l.* and 7,000*l.*, and the following firms have been concerned in the work: Messrs. Perry & Co., general contractors; the Tamar and Coalville Company (terra-cotta work); Messrs. Norman & Burt (wooden chancel-screen); Messrs. Turpin (marble mosaic); Messrs. De Grelle (the font, of veined marble); Messrs. Thomason (brass lectern, altar-rails, &c.), and Messrs. Sotheby (electric lighting).

ELABORATE measures are now being taken at Vienna in connexion with the Danube floods which annually threaten the lower parts of the city. A special Royal Commission will be regularly called together every autumn to make the necessary preparations for the impending danger, and this Commission has full executive powers in case of a catastrophe. The members of this year's Commission have Freiherr von Kutschera as their President, and Dr. Friebeis as their Vice-President. A number of public bodies are officially represented on the Commission, including the military headquarters, the Royal police, the provincial government, the city council, the city board of works, and the Danube conservators. Vienna is divided into eleven districts for the purposes of the Commission, which has its head office at the Town Hall, where a special telegraph station connects the chief of the executive with its officials at some sixty points along the river, as well as with the whole of the police and fire-brigade stations. The Commission is responsible for maintaining order, and clearing all dangerous structures of their inhabitants. They have to house the homeless and attend to their comfort, and they must attend to any necessary shoring, and instruct the housebreakers to pull down buildings if they think fit. There are over one hundred boats and barges at the disposal of the Commission for life-saving and salvage purposes, and these are manned by a staff of 250 men. The Royal Engineers and the Fire Brigade are at the disposal of the Commission should their services be required. It is well to see the city thus prepared to meet any emergency, and we trust that it will not have to suffer from a repetition of such floods as occurred in 1862 and 1871.

DR. S. MONCKTON COPEMAN'S report to the Local Government Board on an outbreak of enteric fever at Loddon, in the Rural District of Loddon and Clavering, states that the drinking-water is entirely obtained from surface-wells, of which there are from sixty to seventy in the town, in the majority of which the depth of water does not exceed 4 ft. The water of the wells in that part of the town which lies between the Green and the river appears to be of universally bad quality, owing probably, in a large measure, to long-continued contamination of the subsoil in that part of the town most remote from the river. Not only is the quality of the water generally bad, but the quantity is apt to be decidedly insufficient for the wants of the inhabitants, especially in times of drought. "At the time of my visit," says Dr. Copeman, "I was informed that previously to the outbreak of enteric fever, which forms the subject of this report, the water of the so-called 'town-pump,' which is situated almost in the centre of the Green, had been in great request, and persons had been accustomed to resort to it for their water-supply, even though living at some considerable distance from it. This was so, as I was informed, for the reason that the water obtained from this well was believed by the inhabitants to be of specially good quality. Since the first week in May, 1895, however, the town-pump has been chained up for reasons stated later on in this report." The reasons were, that in order to see whether any improvement could be brought about in the quality of the water, the well under this pump was opened out, cleansed, and the water pumped out repeatedly, after which a supply of lime was put into the well. While these operations were in progress a large "soakage" well was discovered at a distance of about five yards from the pump well, and connected by a pipe-drain to the covered gulley into which waste water from the pump was received. This soakage well was apparently between eight and nine feet deep, but on investigation it was found that there existed a further deep of about fifteen feet, which was filled up by black mud, the bottom of which was, roughly speaking, on a level with the surface water in the pump well. No direct overflow from the soakage well had been provided, so that as neither well was steined it is very probable that a quantity of fluid material found its way through the intervening soil from the soakage well to that in connexion with the town pump—the pump to which the unfortunate inhabitants had resorted for its supposed superior quality.

AN outbreak of diphtheria in the borough of Flint, reported on to the Local Government Board by Dr. Reece, appears to be attributed mainly to reckless disregard of sanitary precautions among the inhabitants; but the Report adds that the pollution of the soil from the ill-constructed privy middens, and the consequent emanations therefrom, may to a certain extent have prepared the way for an outbreak of diphtheria. Among circumstances conducing to a low state of health among the population are, insufficient water-supply from sources not of the purest, and the common complaint of inadequate provision for the removal of excrement, which is effected principally by means of privy middens, there being only some half-dozen water-closets in the town. The middens are as a general rule of large size, sunk below the level of the ground, "uncemented, uncovered, sloppy, and stinking." The Town Council contract for the scavenging of their district, the middens being cleaned out when necessary; the Inspector of Nuisances calling the attention of the contractor to such privies as require emptying, and each midden is required to be cleaned out once in a fortnight or three weeks. This official emptying at stated periods is what we have always said ought to be the rule in such districts, as the inhabitants can never be trusted to see to it regularly themselves. But unfortunately the officials at Flint seem to be equally negligent, and the period of emptying is generally six to ten weeks instead of two to three. "Quis custodiet ipsos custodes?"

THE manner in which daily papers report meetings on technical subjects is amusingly illustrated in the *Daily Chronicle's* report of the last meeting of the Architectural Association. After giving a short *résumé* of Mr. Toomey's paper, the report concludes—"After some discussion Mr. R. Rust contributed a paper on 'Woodwork,' and he was also heartily thanked at the close." The paper by Mr. Rust had been announced, but, for reasons explained by the Chairman, was not forthcoming; but that is enough for the daily paper reporter, who evidently did not hear the discussion either, which was a very important one.

IT is stated that Lord Carrington, who recently purchased Gwydyr Castle,* has decided to sell his seat in Buckinghamshire. Wycombe Abbey, with its timbered park of about 300 acres, or the sporting estate, extending over 3,000 acres. Wycombe Abbey represents the manor-house of Loakes, which had been demised to the Templars by Robert de Vipont. The manor-house was rebuilt in the reign of James I., and greatly improved by Henry (Petty), Lord Shelburne, who in 1700 had acquired the property. The house underwent further changes, and indeed was practically rebuilt of local stone, for the first Lord Carrington by, it would seem, James Wyatt. The Abbey is included in a list of works attributed to James Wyatt in the "Dictionary of Architecture." The "Beauties of England and Wales" (1801) describes the house as about to be repaired and enlarged by Wyatt, and to be cased with a hard sandstone found in the neighbourhood. These stones, it adds, are dispersed over the ground in single masses, similar to the grey wethers on Marlborough Downs, but have never before been applied to the purpose of building. The cascade was made by J. Lane, who made also the cascade at Bowood.

* See our "Note," p. 44 *ante*. Gwydyr had belonged to the Baroness Willoughby de Eresby, whose sister married the second Lord Carrington.

THE small quarterly publication of the "Society for Checking the Abuses of Public Advertising," published under the title *A Beautiful World*, contains several papers worth attention in regard to the disfigurement of cities and of nature by the advertiser in his various forms. Sir Martin Conway mentions having seen a great vertical wall of rock on the coast of Sweden, rising straight out of the sea, painted all over in huge white-lettered advertisements of margarine. How far is this kind of barbarism to be allowed to go? The best thing in the number is a sarcastic communication from Mr. Julian Sturgis, supposed to be addressed to the Royal Society of Painters in Water-Colours, and calling on them to make the best of the wider opportunities afforded them by the advertiser. Nature no doubt is getting spoiled, but there is a more cheerful view to be taken:—

"Meet the new state of things with a cheerful mind and a bolder paint-box. If the boards of the advertiser forbid the mere imitation of fields and hills, be yourselves the painters of the boards. Throw yourselves at the feet of the proud leaders of commerce, whose advertisements the awe-struck amateur beholds with flashing and admiring eye from the window of the railway carriage, and beg to be permitted to exercise a bolder and more sweeping brush on those extensive panels. Nor stop at the mere earth. Were not the sails of Venetian fishing-boats made lustrous by painted symbols? A fleet of smacks, and serried ranks of bathing-machines invite you. And behold the generous spaces of the air! Sky-signs, balloons! The spirit fails before the vastness of the possibilities before you, and the immediate rise in the price of paints."

A CORRESPONDENT of the *Times*, writing from Kingston, draws attention to the neglect of the old furniture, tapestry, &c., at Hampton Court, alleging both that it has been injured by visitors for want of proper supervision (he asserts even that bits of tapestried chairs have been surreptitiously cut out as relics and carried off), and that it is deteriorating also for want of proper care in cleaning and a proper staff to look after it. This is a serious matter, for Hampton Court is a unique example of a great suite of rooms of its date, and it may be said that the tapestry and furniture (especially the tapestries in the gallery out of the great hall) are of far more artistic and archæological value than most of the pictures.

THE ARCHITECTURAL ASSOCIATION.

BRICKWORK.

THE ordinary fortnightly meeting of this Association was held on the 20th inst., in the meeting-room of the Royal Institute of British Architects, Mr. W. D. Caröe, M.A., F.S.A., President, in the chair.

The minutes of the previous meeting having been read and confirmed, Messrs. W. J. Devlin and A. Hendy were elected members of the Association.

Mr. Banister F. Fletcher (Hon. Sec.) announced the following donations to the library: "The Builder Album of Royal Academy Architecture, 1895," presented by Mr. H. H. Statham*; and three copies of the pamphlet, "Domestic Metal Work," presented by Mr. H. Sirr. He proposed a hearty vote of thanks to the donors.

The vote was unanimously accorded.

The President intimated that the following classes were commencing: Materials (Div. II.), Wednesday, January 1, by Professor Kerr; Practical Design, Monday, January 6, by Mr. Beresford Pite; and Elementary Water Colour, Thursday, January 9, by Mr. W. G. B. Lewis.

A paper was then read by Mr. J. Toomey on "Brickwork." In the course of his observations Mr. Toomey said:—

It will be easily understood that in a paper of this kind, with a time-limit, scarcely more than the fringe subject-matter can be touched upon. Therefore I will confine myself to materials used by bricklayers, with a few remarks on methods of using them.

* This was a mistake. It was presented by the proprietors of the *Builder*.—ED.

Sand.—I have often found that the quality of the sand used for building purposes does not receive the attention it deserves. A clean, sharp, sand is essential to the making of good mortar, whether mixed with lime or cement. The many impurities to be found in sand must act injuriously and tend to detract from the strength of the mortar. The best way to avoid this is to wash the sand, but the expense attached to this process prevents its general adoption. But I have used a "Medway" sand, and one from the neighbourhood of Hatfield, good in quality, being both sharp and clean. Where a mortar-mill is used the "clinkers" from a dust-destructor mixed in reasonable quantities with sand and lime or cement make a good mortar. But it is always an important point to see that a proper proportion of lime or cement is used, which is not always done.

Bricks.—The question of the qualities of bricks is such a large one that I shall only be able to speak of a few kinds. The numerous kinds of bricks that are now in the market show that greater attention is being paid to their production, chiefly in facing bricks (external). They may be divided into two classes, viz., the "sand" brick and the "pressed" brick. The different processes of manufacture of the two bricks being so different, the sand brick being moulded, whilst the materials are of a dough-like consistency, and the other being "pressed," while the ingredients are nearly dry, must tend to make the pressed brick squarer and more regular in shape and size. But a brick, like terra-cotta, must be well burnt to be durable, and in burning it loses in shapeliness what it gains in durability. But the question will arise in my remarks on the samples of bricks which have been kindly supplied by a well-known firm. I shall use the name by which the brick is technically known.

[The reader of the paper then referred to and commented upon various specimens of bricks in ordinary use which were exhibited, and distinguished by lettering. In regard to *Malms* he remarked that they had gone out of use very much as facing bricks in consequence of the competition of cheaper external facers. The small holes which appeared on them when rubbed were caused by the method of burning, and he thought some means might be devised to avoid this. *Shippers*, next alluded to, were described as similar to Malms but harder burnt; they were used as the facing to the London Board Schools, and were the most durable for that purpose in the market. *Stocks* were included in the same class. These three bricks he considered unequalled for durability and cohesion; he had experienced the greater labour in cutting through walls built with them, as compared with pressed or wire-cut bricks. The *Red Sand Brick* (D) had the advantage of retaining its warmth of colour and even improving with age; many were apparently soft, but they hardened with age. *Red Pressed Brick* (E) had an advantage in uniformity of size, but in exposed situations he had seen the surface peel off and expose the rough interior. Comparing D and E the makers of the latter had recognised the demand for a brick regular in size and with a clean sharp arris, while little effort had been made to improve the D type. The latter, however, had the advantage in colour.

The wire-cut brick (F), though used, for cheapness, for internal facing, was inferior to the common Stock. The principal point in favour of the Fletton brick (G) was its squareness and that it could be delivered in London cheaper than a Stock brick in many cases. *Glazed bricks* (H) included many inferior kinds with which it was impossible to do good work, and to make a satisfactory job with even the best quality it was necessary that those laid on each course should be gauged before being laid, or joints of uneven thicknesses would result. *Salt glazed bricks* (I) made serviceable work for dados, &c. Their faults were variation of tint and many small blisters on the surface. A second specimen (J) was exhibited. It was possible to obtain them with these faults reduced to a minimum, but care should be taken that the external and internal facing-bricks were the same thickness.]

Methods of Bedding Bricks.—I think it is essential (except during the winter months) that bricks should be well wetted before being laid. This is all the more necessary where cement-mortar is used. The only possible way to secure strong work is to "grout" each course of brickwork, and this is where the advantage of "washed" or well-screened sharp sand is seen, as it will more readily fill the open joints of the brickwork. The plastering of mortar on the top of each course will not do. But the fact that wet bricks make bricklayers' fingers sore may have something to do with the neglect of wetting bricks. In work that is to be pointed after the building is erected, the joints should be raked out half an inch deep, and well brushed off with a hard broom to clear away all loose mortar, and the pointing should be well pressed or "ironed" in the joints.

In glazed or enamelled work it may be often noticed that after a time the "glaze" flakes off, and the defective part appears black. This is very often due to using chipped or defective bricks, but it is also due sometimes to another cause—viz., the mode of bedding them.

The bricks having two deep "frogs," and generally being laid in a close joint, care is not always taken that sufficient mortar is spread to ensure the frogs of the brick being solidly filled so that when the weight comes on the wall the pressure is largely on the outer edge of the brick and causes the "glaze" to fly. One way to obviate this is to fill the "frogs" before laying the bricks. Another way is to "joggle" either the end or side of the brick before bedding and fill or "grout" them up with liquid mortar.

One more point, and I shall have finished. The conditions of present-day building often compel builders and others to carry on their works in sections. Very often walls are built with a vertical "toothing." If this cannot be avoided I think the connexion or making good to such toothing should be done with cement. Of course there are many other points that I have not touched for want of time.

The President having invited discussion,

Mr. Seth Smith, in proposing a vote of thanks to Mr. Toomey, said those present had listened to a paper that was eminently practical. The subject was one upon which they all doubtless felt they knew something, but at the same time it was one with reference to which they could always learn a great deal more—a remark which perhaps applied to almost every department of their experience. He was sure they all learned much more than they could teach the bricklayers very often when they visited work that was proceeding, and found how many practical points, such as those that had been explained by Mr. Toomey, required attention—not only little practical points, but also points of principle, especially the last one, as to the toothing. He had often noticed how extremely weak toothing work was unless it was built up in cement, and it was an excellent suggestion that they should adopt a blocking system instead of the individual courses, where they were obliged to use toothing.

Mr. Francis Hooper seconded the motion. His opinion was that in many cases the workmen with whom architects had to deal were practical men, and where they met with scamped work it was not always the wish of the men that there was that character about the work; there were often other agencies, quite apart from the incompetence of workmen, which were responsible for the scamping that was done. Mr. Toomey had dealt with some very practical points, and if these were taken to heart some benefit was sure to accrue. His remarks as to bonding two different kinds of bricks in a wall were extremely interesting. He (the speaker) had a particular association with brickwork at the present moment, for he was acting on one of the Committees of the Institute, and that day he had been to the West India Docks to witness the experiments being carried out there in the testing of brickwork. Feeling that there was still an opening for experimental research as to the relation between the brick and its use in a wall, the Institute had had a series of piers built, and tests were now being brought to bear on piers that had been erected some four months. A remark had been made by a very competent contractor that it was futile or unreasonable to use a pier at such an early stage; but, as a matter of fact, brickwork was tested at a very early stage of its existence, although it might not at once have to bear the full strain to which it would ultimately be subjected. It was very interesting to know the strength of a pier in its early days, and in order to extend the experiment other piers built at the same time were to remain for another eight months, when they would be able to ascertain what was the increased strength after a further interval for the purpose of setting. By carrying out these experiments, the Institute would be rendering very great service, not only to the profession, but also to the community. He considered the relations between the architect and the operatives on a building should be of the most cordial kind.

Mr. F. T. W. Goldsmith wished Mr. Toomey to tell the meeting exactly how to carry out the ordinary specification for laying bricks in a 9-in. wall. His attention had been called to the point by an eminent and much-respected member of the profession, and he had since asked a number of bricklayers, some of whom had said one thing and some another. If the bricklayer had to mortar every side of his brick except one, how was he going to put the bricks into his 9-in. wall? Nine men out of ten had told him they could not do it. There would be no adhesive material whatever between the vertical joint of the brick, if what Mr. Toomey advocated was carried out, for that gentleman insisted upon $1\frac{1}{2}$ in. of mortar being raked out. In that case the only thing to hold the wall together would be the mortar that pointed it. Mr. Goldsmith further said he was gratified to see an operative amongst them, and trusted Mr. Toomey's would be the first of many such papers that might be read before the Association.

Mr. B. F. Fletcher remarked that Mr. Toomey had made mention of wetting bricks in the summer, but surely it was just as necessary to wet them in winter, though not perhaps to the same extent. Regarding a motar-mill, he wished to ask the reader of the paper whether he had any ideas as to the relative strength of mill-made mortar and ordinary sand (hand-made) mortar. Bricklayers always thought the former was very much the stronger; and further, if they used mill mortar they could use up broken bricks. He believed Byzantine brickwork was almost entirely made with broken bricks. As to the thickness of the joint in Roman work, as well as in Tudor work in England, they seldom saw less than half-inch of mortar. He was at Compton Wynyates in the past summer, and noticed there was no Tudor work there which had less mortar than half-an-inch. Architects often specified that no four courses should rise more than 1 ft.; but why should they not rise even 1 ft. 3 in.? If the mortar was good, why should they not have plenty of it? The limit stipulated by architects was painfully apparent at Compton Wynyates, because in the Queen Anne brickwork they saw such thin mortar joints that the effect could not be compared to that of the work of the Tudor period. As to toothing, engineers did not believe in it at all, as it was bound to result in cracks and broken bricks.

Mr. F. Walker congratulated Mr. Toomey on the practical paper he had read. With respect to the question of washing sand, that was all very well if they could afford to pay the expense; building, like everything else, depended upon the price being paid for it. His experience was that they could get plenty of sand without washing that would serve their purpose. He was now using some unwashed sand—certainly it was Thames sand—which was thoroughly sharp and angular. In that case washing would be altogether superfluous. In his opinion, it was immaterial where they got their sand from provided it had the requisites to make good mortar. The mortar-mill had its advantages and its disadvantages. An advantage was that the ingredients got fairly well incorporated. A great disadvantage was that unless a careful man superintended the grinding, the mortar would be ground to such an extent that there would be no grit left in it, and that when it dried it would become mere dust. It was often specified that no more mortar should be made than could be used on the same day, but they were told that the Romans and other ancient builders, slaked their lime a long way ahead of its being required for use. His own experience was that the older their mortar was—provided it was not allowed to get thoroughly dry—and the more often it was tempered and re-tempered, the more tenacious and workable it became. He noticed that the samples of brick exhibited were all from one maker; he, however, would like to have seen samples from other manufacturers. With regard to sand-faced and pressed bricks, his opinion was that unless they were thoroughly good they were not worth using. The peeling of the face of pressed bricks was due, he thought, to the use, for the purpose of oiling the moulds used in the pressing, of machine-oil, which deteriorated the face of the brick to some extent. He did not care for malms for exterior work, because of their absorbent nature; unless they obtained very hard malms they could not generally be used for front and best work, for they not only absorbed moisture, but also held soot particles, &c. Shippers were undoubtedly the best bricks that could be used in London, not only for their hardness, but because of their having a variety of colour, which was more pleasant than the dead, even, yellow tone which

they saw in a malmed front. Mr. Toomey had said that the red in red pressed bricks was a somewhat questionable quality, as it indicated that the brick had not been thoroughly burned. His (the speaker's) own experience, however, was that the darker the colour the more durable was the red brick, and that the colour was a good criterion to go by. If they secured weight, density, and darkness of colour they might rest assured they had a thorough good brick. He agreed with Mr. Toomey that Leicester produced very good bricks, but it was a generally-accepted opinion that the whole of the coal measures yielded good ones. Everybody had doubtless noticed that red sand faced bricks improved with age, especially the Fareham bricks; not only in colour, but also in their weathering properties. Wire-cuts had, no doubt, the advantage of rough sides, thus giving a stronger adhesion for mortar, but in other respects he did not care about them. Nor was he favourable to Fletton bricks; no doubt, they were very much che aper than stocks, but for exterior work they had very poor weathering properties. With regard to glazed bricks, these could not be made into good solid work unless they had a fair joint, and another unfavourable point about them was their susceptibility to craze, which looked like pencil marking. He would point out that a salt glazed brick was not dipped; the glazing was done in a kiln by means of a salt vapour, and the bar which would be seen running across some of the faces was caused by the bricks being placed too close together in the kiln, in which case the vapour was not able to reach the whole of the face properly. With respect to the unequal thicknesses of joints, this could not happen in gauged work. If they wanted to obviate the possibility of shrinkage or anything else that was likely to lead to fractures or cracks, they should gauge their mortar with Portland cement for interior work. The speaker next opined that it was dangerous to wet bricks in winter, though they wanted it in the summer, to effect a proper adhesion, which might otherwise be prevented by dust. In America, during severe frosts, they had large fires, surrounded with bricks, and they used hot bricks and hot mortar. That was a bad way of building, but they were surrounded by circumstances to which they were bound to conform. He agreed with Mr. Toomey that if pointing were done, the point should be well raked out. If they insisted on that, they would soon do away with pointing, because the raking out would cost as much as the pointing. He was unfavourable to pointing, which, he contended was productive of a bad, shoddy class of men. Let architects get back to the old style of striking the work as the bricklaying went along, and then they would obtain good work and good workmen. Everybody admitted the evil of toothing, which could not be compensated for, whatever they might do. On the question of mortar, bricklayers liked that which was mill-made, it being more plastic and pliable to their trowels, but he personally preferred the old hand-made mortar, in which they obtained the pure ingredients.

Mr. Owen Fleming considered the Association was much benefited by one of the great organizations of workmen sending a representative to discuss with the architects one of the crafts with which they had to deal. They had expected three crafts to be represented, but their regret at two of those not being represented, was tempered by the satisfaction they felt in being able more thoroughly to thresh out the subject of brickwork. He hoped that, at some future time, papers on lead-work and wood-work would be read at their meetings. It might also be well for the Association to send a representative to gatherings of the workmen, so as to lay before them the views of the architects. As to the manufacture of mortar, the economic conditions of London work compelled the use of the mill. They often built upon the site of an old building, where there were excellent old bricks for making mortar, provided they used also a certain proportion of sand. Such mortar, however, was not of the colour that an ordinary architect liked for the joints, and therefore he thought that when he came to have the work done the London architect would probably let his theory go, and have his job pointed down afterwards. He wished to ask Mr. Toomey whether there was any combination of sand and cement that would withstand the frost and give that pleasant creamy-white appearance that was so admired by architects, in combination with red brick. As to bricks generally, Flettons had their use, but were not good for outside work, as in this case their skin was likely to come off. There were many places inside buildings where Flettons could well be used, and they were of course cheaper than stocks. As to external work, doubtless members of the Association had noticed that in the market lately stock facing and red facing had come very close, and red facing of a really decent kind had even been obtainable cheaper than stock facing. This was not so much because of the initial cost of the brick, although that had a good deal to do with it, but because it was very difficult to do a good stock-faced job without spending a very large amount of time and labour. Stock bricks were so knocked about that when they came to be used it was difficult to find a single face without the arris being chipped. He thought London contractors preferred to do a good red sand-faced front than a stock-faced front. Of red bricks, the sand-faced was the best for London; it was cheap, it looked well, and it generally kept its colour—but sometimes these bricks had the curious habit of getting green. With reference to the mortar question, he had specified that the joints should be well flushed up, and finding this had been done he had complained, to be then told that he should have said at first that he wanted a "buttered" joint. He wished to know whether an architect, if he wanted the bricks covered with mortar, must specify "buttered" joints.

Mr. H. H. Statham said that in the days when he was a pupil a flushed-up joint meant that the brick should be entirely surrounded with mortar, and he thought "buttered joints" was a corruption of the bricklayer, perhaps of the contractor. Mr. Fletcher had referred to thick mortar joints. That was an æsthetic question partly. There were some people who said, "The less you see of the joints, the better"—that was to say, a brick wall was to be one expanse of smooth brickwork. That was what might be called a neat taste. Others wished to see as broad a mortar joint as they could practically have, and that was what he called an architectural taste. There was a grand nervous look in a wall with broad joints, which they could never get by smoothing down and making it as thin a joint as possible, and that was the way the greatest ancient architectural works in brickwork had been carried out. The reluctance of many modern architects to have thick mortar joints might be explained by the fact that, whereas they could see before them the bricks that were to be used in a building, they did not know what the mortar would be like, and they were naturally nervous in trusting to a considerable thickness of mortar, which might result in a settlement. To his mind a thick joint had the finer appearance in every way.

Alderman Taylor said the representatives of the workmen present were very pleased to be able to come into contact with the architects, and his opinion was that a great deal of good would come of such meetings, provided they each understood what the other required, which was the end at which they should aim. In setting out the front of a building he thought architects made a mistake in giving, as they nearly always did, the size of the openings instead of the size of the piers. If they were to give the size of the piers, and let the openings work out at whatever size they might, they would get a proper bond in all their piers. When the openings were set out they got a broken bond in every pier in the building. When he commenced work about a quarter of a century ago, his father, whom he then assisted, never did any painting, and the face of the work they did then was now as good as ever, scarcely a joint having gone anywhere. If it were possible to carry out work on that principle twenty-five years ago it was possible at the present time. If anything had tended to demoralise the trade of the bricklayer it was the introduction of pointing and the so-called specialists. If the workman who laid the brick had to give them the finished article in the first instance he would naturally take more care over his work than if he knew somebody else was to finish it for him, who would in all probability spoil it in the finishing. He had seen many jobs that looked better when they had been merely raked out than when they were pointed. He hoped the work would be reintroduced. Let them once have a demand for the workmen, and they would get them, and the work would be done to their satisfaction.

A Member inquired whether any of the buildings referred to by Alderman Taylor were erected in the winter.

Alderman Taylor replied that they were. As to 9-in. walls, and properly filling up the joints, he knew that some architects specified that cross-joints should be put up the whole length of the brick. He could only say it was practically impossible to get good work by doing so because of the great difficulty experienced in obtaining bricks which were perfectly square. With regard to milled mortar, he was once engaged on a job where such mortar was used, and he said to his mates, "Why, you could grow potatoes in this stuff. I've never used anything like it before." About twelve months after he was engaged on an adjoining building, and had to cut out some of the old work, and it was not until then he realised what excellent mortar it had been; he had imagined it to be the rottenest stuff possible, but was mistaken. This led him to the conclusion that they might get some very good mortar from the mill provided no dirt or mould was allowed to find its way into it. The speaker urged that if architects would draw up practical specifications and insist on having them carried out they would revolutionise the building trade. He was sure that, whilst the architect was anxious to make a drawing look pretty on paper, the workman was just as anxious to make the building itself worthy of admiration.

Mr. Woodthorpe, referring to the question of bricks that would keep out the weather, said his own experience was that bricks made in sandy districts could not be used for hollow walls.

A Member said that some years ago there was a good deal of talk about mixing sugar and treacle with mortar, but he had heard nothing of the matter since. Had Mr. Toomey ever heard of such ingredients being used?

The President remarked that the innovation of which he spoke in anticipation at the previous meeting had proved a very great success, although at one time he feared it would end disastrously. It had been intended to have three papers, but the gentleman who was to have addressed them on "Lead Work," had a difference with the committee and his union and was unable to do so, while Mr. Rust was prevented by a family bereavement from reading a paper on "Woodwork." Still the meeting had been a success, thanks to Mr. Toomey, Mr. Walker (whose manual on "Brickwork" was well known), and others. Proceeding to make a few observations on the subject of the evening, the President advised the younger members of the Association to avoid the mortar-mill. On the whole, its evils outweighed its advantages, for he had known cases where the mortar had been ground to such an extent that there was no goodness left in it, and it was exceedingly difficult for the architect and for the clerk of the works to discover when that was the case. The question of pointing was exceedingly important, and he was in favour of striking the work during its progress. One of the greatest evils that had arisen from the necessity of doing rapid work was this pointing, which was hardly ever properly done, the result being that buildings had to be repointed year after year. If the building had to be finished in the winter or early spring, however, it seemed almost a necessity to do the pointing after the completion of the work. Speaking of frost reminded him that in the northern countries of Scandinavia they used, in the winter, mortar pattially mixed with unslaked lime, and the process of slaking set up heat and prevented the mortar from freezing. That seemed very simple, and he had tried it in England, but had signally failed. It was certainly in that direction that they should advance, if they advanced at all, rather than in the direction alluded to as to what was done in America. He had always preferred wide joints for both brickwork and stonework, and was glad to hear Mr. Toomey's practical observations on the subject, as well as to hear Mr. Statham uphold wide joints from the æsthetic point of view. They would never do wrong in building if they had wide joints, provided always that the work was not required to be done too rapidly. Obviously the wider the joint the more tendency the mortar had to sink, and the greater the possibilities there were of a settlement taking place, especially if the work did not go up regularly, and thus put a limit on the joint referred to by Mr. Fletcher. Connected to the question of wide joints there was another æsthetic question. He had over and over again been asked why he preferred very small bricks to those of ordinary size. His answer was because of the difference of effect in the building. Pugin, in his "Contrasts" gave a building drawn in one case with large stones of equal dimensions, and then the same building drawn with small stones irregularly bonded, and the difference in scale which appeared in exactly the same building with the same outline and detail, was remarkable. The same thing applied to bricks. In the north

it was a frequent and abominable custom to erect three courses in 10½ ins., the bricks being 3¼ ins. instead of 2⅝ ins., and the building consequently looked much coarser and harder than where smaller bricks were used. The reason was that the brick itself was sufficiently large for them to see the regular pattern and joint of the brickwork. As they reduced the size and increased the mortar there was a greater need of dividing lines, which confused the eye, and therefore the actual pattern of the laying of the bricks, which of course were laid symmetrically, was lost. The result was the same as in Pugin's building, namely that the building looked much larger and broader with the small brick and wide joint than with the large brick and narrow joint. Those present would have noticed how extraordinarily buildings in Italy were affected by earthquakes. He was sure that many of the earthquakes which had taken place there and destroyed many buildings, would have had little effect in any country where decent buildings were erected. The reason was that in Italy they nearly always had fine weather, and the mortar and stones or bricks used for building purposes were almost dry, so that if they cut into an old building in Italy they found no adhesion whatever. They used excellent materials, and yet had that wretched result. He remembered a law case between an employer and a contractor who refused to wet the bricks he used, because that was not provided in the specification, and this pointed to the fact that it was wise to mention the matter in a specification. As to the absorbent character of bricks, he had known hand-pressed bricks carry water through to the inner side to a much greater extent than sandy and apparently very porous bricks. It was really very difficult to decide which class of brick carried the water through most. He regretted the influx of Leicester bricks into London, for there was nothing more commonplace or miserable than the colour of Leicester bricks, which were hard and unsympathetic to a degree. If they could feel certain that their excellent sand bricks would keep out the water they would do much better to stick to them. Peterborough or Fletton bricks were exceedingly difficult to plaster upon, owing to their affording no key when the joint was flushed up straight. If they used Fletton bricks in the interior they should be careful to specify, if they were going to do plastering, that the joints were kept well back.

The vote of thanks was carried unanimously.

Mr. Toomey, having acknowledged the compliment, proceeded to reply to several of the questions raised. With reference to a 9-in. wall and cross-joints, if the architect specified joints to be put right through, that was the only solution of the question. At any rate, if they laid a heading course, whether specified or not, cross-joints should be put at least 4½ in. on the face. As to wetting bricks, he was well aware that in winter there was an objection to pursuing this course on account of frost. He agreed that it was possible to grind mill-mortar too much, but his experience was that this was not done, and that the usual complaint was that the mortar was too rough. He had never known an instance where the stuff was ground too much in the mill. In most cases the mortar was mixed down in the basement in the dark, and not one clerk of the works in one hundred went down there. The consequence was that the proportion of sand to cement varied between 2 to 1 and 20 to 1, the matter being left to the sweet discretion of the man who did the mixing. There were objections to both kinds of mortar, but if the ingredients were all right they would get a better mortar—more regularly incorporated—from the mill than from hand-mixing. His opinion of the Fareham brick was that no better was made. It was far better than the Lawrence brick, though the latter was preferred by many because of the question of price, and also because the cutting of the Fareham brick involved 25 per cent. more labour. It had been asked whether mortar would stand frost; the only time it would stand frost was when it was freezing very hard. For hollow walls they must have a brick like a shipper, and space should be provided at the bottom for clearing out the mortar that fell down between the walls. He had heard of the use of treacle and sugar in mortar, but had never known these ingredients to be tried practically; they had certainly never been in common use in this country. As to the use of Fletton bricks for plastering or internal facings, they would not take the plastering as well as stocks unless the joints were well raked out. Others besides Flettons required this to be done to the extent of at least ½ in. before the plastering was proceeded with. The speaker deprecated the sub-division of labour to which subsequent pointing led, remarking that if they so cut up the trade the really practical men would become extinct, just as the cabinetmakers of the old time had. The pointing of the Great Northern Hotel was done as the work proceeded, and the work remained. The bricks used were malms. On the question of pointing there was one objection—namely, that sometimes men would take three courses, and then point them; but if that were done they would not find they had the durabillty which was secured if the pointing was done as the men went along.

The President announced that the next meeting would be held on January 10, when Mr. H. T. Hare would read a paper on "Municipal Building." The meeting then terminated.

NOTES FROM THE STRAITS SETTLEMENTS.

ON the night of September 30 last, Singapore was the scene of a disastrous building calamity—the sudden collapse of a large building in course of construction in the centre of the business quarter of the town, resulting in the entombment of fourteen Chinese workmen, twelve of whom were taken out of the *débris* dead, and the other two were rescued alive, but one died next day, making the total number of deaths thirteen. Besides this, two Europeans who were passing at the time were injured but not seriously.

Fortunately the disaster occurred about nine o'clock at night, when the business part of the town is almost deserted. Had it occurred during the day a very large number of people must have perished, as the spot is a very busy one.

The building which collapsed was one end of a large block of business premises, part of which has been finished and occupied for some months. The place was intended as a large retail store and wholesale warehouse, except two small portions at the ends, which were to be let separately as "shop houses." It was through making up one of these shop-houses quickly and in advance of the other work that the accident occurred—or so it is supposed.

The building is a lofty one of three stories, with turret and heavy brick dormers above. When the collapse took place the main walls were up about 40 ft., except in one place, where they were up the full height—that is, fully 20 ft. or 30 ft. above the rest of the work. Piers of brickwork 10 ft. or 12 ft. high had also been built above the general level. In the afternoon of the day the place fell there was an exceptionally heavy storm of wind and rain, and no doubt this had a bad effect on the rapidly and badly-built brickwork, which was standing so much above the general level.

The work was disgraceful, especially the brickwork, and when one examines the remains one can see how difficult it would be for such a building to withstand a storm.

The place was being built by its owner, a Chinaman named Tan Jiak Kim, who engaged an architect to prepare plans and superintend the foundations, but would not pay for the superintendence of the rest of the work.

At the inquest on the bodies the coroner's verdict was "that the contractor was guilty of a rash act not amounting to homicide." He has to appear at the sessions on the 18th inst.

Some time ago the Chinese Protectorate Offices, which were erected by the P.W.D. some few years ago, suddenly sunk on one side, the front side, so much so that the walls were nearly a foot out of plumb. To remedy this defect the Government are adding on new rooms in front and generally repairing and enlarging the place.

Large blocks of barracks are being built on the islands of Pulo Brani and Blatang Matia, which are to be occupied, I believe, by the Royal Engineers and Royal Artillery.

In Singapore no very important buildings are going on at present, but there is a great demand for moderately large houses, for which very high rents can be obtained. Many new houses are being put up, but still the demand exceeds the supply, and judging by the rents so easily got, the owners of house-property must be having a good time.

The Government Offices at Selangor, which we described a year ago when the foundation-stone was laid, are going on rapidly, and already the roof is being put on; this is very much sooner than was expected. The work has been entirely done departmentally, under the direction of the State Engineer.

The waterworks which will supply Kuala Lumpur, the capital of Selangor, and which have been in course of construction during the last five years, are now nearing completion, and will be opened by the Governor of the Straits Settlements in December. Already part of the place is being supplied from the auxiliary reservoir. The water is brought from Ampang, a distance of about six miles from the town. There are two impounding reservoirs (one is a very small one, to be used as an auxiliary), and the water gravitates through pipes to the service reservoir near the town, on a hill about 230 ft. above the plain. From this the town is supplied—the native quarter with street stand-pipes, and in the European quarter it is laid on to the bungalows.

Two miles from Kuala Lumpur a new gaol is being completed. It is designed to accommodate 504 prisoners, who will be most comfortably housed—far more comfortably and cleaner than most of them would be in their own huts.

Next year very little is to be spent on buildings, and all the available revenue will be spent on new roads.

Now that the Federation of the Native Malay States is sanctioned, Kuala Lumpur must go ahead even more rapidly than it has hitherto done, as it is to be the seat of the Federal Government.

In the Native State of Perak not much building is going on. They are building new Government Offices, and are spending only half as much on them as their neighbours in Selangor.

A very important piece of road known as the Slim road is under construction, and when this is completed there will be a cart-road from Malacca in the south to Province Wellesley, opposite Penang, in the north.

Not long since an istana, or palace, was built for H.H. the Sultan of Perak. On plan it is a large parallelogram, and the style of work is Renaissance.

X.

ELECTRIC TRAMWAY IN ROME.

THE new electric tramway which connects the main railway-station of Rome with the centre of the city is proving a great success as a means of rapid communication between the high and the low parts of the city, although it has had many difficulties to contend with. The Local Authorities wisely refused to allow their principal streets to be desecrated by the poles and wires of an overhead system of traction, so the route chosen was very difficult on account of the steep gradients encountered in several places, as well as some very sharp corners. It starts from the Piazza S. Silvestro and goes up the Via di Capo le Case, and then through the Ludovisian Quarter to the Piazza di Termini. It consists of a double track nearly two miles long, and the general arrangements are the same as on the Havre tramways. Where telegraph and telephone wires cross the tramway, guard-wires of steel are suspended to stop their fall and prevent them touching the trolley-wire, if by any chance they broke. They are certainly not beautiful, but they are essential to the public safety. The trolley-wire is supported by double-bracket standards; where the track makes sharp bends cables attached to the walls are necessary to pull it out into the required curve, the wire coinciding really with the sides of the inscribed polygon. In some places the incline is over 8 per cent., so special brakes are necessary. Both hand and feet brakes are used, one acting on the wheels directly and the other on the rails.

In addition, there is an electric emergency-brake, which will stop the car in a few yards, even when going quickly down hill. The principle of it consists in short-circuiting the motors, which are then driven as dynamos by the momentum of the car, which is thus rapidly stopped. The cars weigh seven tons when empty, and when loaded their carrying capacity is stated as forty; but there are often more than fifty passengers on them; their weight is about ten tons. They start every five minutes, and take thirteen or fourteen minutes to perform the whole journey, the maximum speed allowed being nine miles an hour. The cars are well lit, and an elaborate system of electric-bells enables each passenger from his seat to communicate with the motor man.

The motors are worked by current bought from the Electric Lighting Company, who possess the famous Tivoli-Rome transmission plant. At Tivoli, on the slope of the Sabine Hills, the power developed in large turbines is converted into electric energy by alternators, and is conveyed at high-pressure by four cables across the Campagna, a distance of eighteen miles, to a transformer-house just outside the Porta Pia, where the pressure is reduced before

it is distributed to various sub-centres in the city. As the current is alternating, it is transformed into continuous by means of high-speed dynamo-motors; it is then used to charge accumulators, and give a constant 550-volt supply to the trolley-wire.

The General Electric Company of America did the overhead work and the equipment of the cars.

ALMANACS AND DIARIES FOR 1896.

WE have received from Messrs. Hudson & Kearns, of 83, Southwark-street, S.E., a parcel of their diaries and blotting-pads for 1896, the merits of which we have referred to in previous years. "The Architect's Diary," issued in two sizes, Nos. 12 and 13 (one and two pages to a day respectively), has been made more useful to architects by the inclusion, in response to our criticism of last year, of more information respecting provincial architectural societies, though even now the information is not complete, and what is given might be better arranged. All architects who use these diaries may be expected to refer to them for the names of Presidents and officers of provincial and other architectural societies, and the more complete this information is, the more satisfaction will the works give. For the rest, we have nothing but praise for the diaries. They are well-arranged, and contain, in addition to the usual information, the names and addresses of District Surveyors, cases of interest to the profession decided in the Superior Courts during the legal year, from November, 1894, to August, 1895, the professional practice and charges of architects, revised regulations under the 1894 Building Act, the Metropolis Management and Building Acts Amendment Act, 1878, some of the architectural, surveying, and engineering institutions, with the names of their Presidents, &c. "The Builder's Diary" No. 11, and "Diary and Note-book" No. 9, contain much of the information to be found in the Architects' Diaries, but they have been arranged more for the use of builders and contractors. The same firm also send us some date-indicating blotting-pads in various styles and sizes. Nos. 8, 8A, and the "Banker's Pad" are especially good pads.

"Sprague's Pocket Diary and Architects' and Surveyors' Memorandum Book, for 1896," revised edition, is a useful little memorandum book, containing a number of tables of statistics and data as to materials used in building, &c. It is issued, as before, in two forms of cover; one as a memorandum book closed by a band, the other as a flat folding case for carrying letters or memoranda, with the diary in one of the pockets.

"The British Almanac and Companion" for 1896 (London: The Stationers' Co.) contains, in addition to the usual information relating to public offices and departments, and Acts of Parliament passed in the last Session (with abstracts of the more important ones), Mr. R. Langton Cole's usual review of architecture in the past year. The article, which is accompanied by an illustration of Messrs Aston Webb and Ingress Bell's addition to the old Chapel Royal in Whitehall, and which briefly describes most of the more important buildings erected or being erected in London and the provinces during the year, in referring to the decorations at St. Paul's, proceeds as follows:—"The gilding, however, to an architect's eye, seems to largely destroy the design of the building, and to leave no merit to honest stone over its counterfeit in plaster. The gold on the cornice may be needed, to avoid too sharp a break between the ceiling and the walls, but the gilding of the capitals does not seem so necessary. As a whole, however, the decorations will give the Cathedral the warmth and colour which Wren meant it to have, and that in a form worthy of the building and its great designer." The same work also contains the following articles:—"The Art of the Year," by Mr. Charles Kains-Jackson; "Drama," by Mr. Joseph Knight; "Engineering in 1894-95," by Mr. Langton Cole; and "Science," by Mr. E. W. Maunder.

From Messrs. W. H. & L. Collingridge (*City Press* office, Aldersgate-street, E.C.) we have received the "City Diary and Almanack for 1896." This well-arranged and handy little annual contains a large amount of information in regard to City and City affairs, and the fact that this is the thirty-third issue speaks well for the work.

"The Railway Diary and Officials' Directory for 1896" (London: McCorquodale & Co., Ltd.) has been sent us. The diary contains a great deal of information as to traffic returns, accounts, dividends, list of officials, &c., which will prove interesting to some of our readers. The same publishers issue a "Railway Almanac," which is a useful sheet.

"The Indian and Eastern Engineers'" Diary for 1896 (Calcutta; and London, 1 & 2, Victoria Mansions, S.W.), which is presented to yearly subscribers of that journal, contains, as a new feature, a railway directory, which embraces the whole of Asia, except Turkey and Russia. The tables and formulæ have been retained this year, and some additions have been made to them. The publishers draw special attention to the table of conversion of English and metric weights and measures. The work also contains a directory of British merchants and manufacturers, besides other useful information. As we have stated on previous occasions, the diary is very well got up, and no doubt it is much valued by those for whose use it is specially intended.

Another useful and well-arranged diary is that published by Messrs. Hazell, Watson, and Viney, Limited, of Long Acre, W.C., and which is called "the District and Parish Councillors' Diary and Guardians' Manual for 1896." The diary consists of two days to a page, and contains a full text of the Local Government Act, 1894, a digest of its provisions and most of the enactments incorporated with, or referred to in, the Local Government Act, the circulars of the Local Government Board, and a mass of general and useful information. The work also includes the more important circulars and memoranda issued by the Local Government Board and other Government departments.

THE POST-OFFICE LONDON DIRECTORY.

"THE Post-office London Directory for 1896" (London: Kelly & Co., Limited), is the ninety-seventh issue of a work which becomes larger and more indispensable each year. Though the Directory has increased by no more than twenty-nine pages (3,002 pages against 2,973), still the prospect of a bulkier work each year has suggested the need of separate sectional directories, which, we believe, will become a necessity of the future. The size of the work, however, in no way detracts from its value, and evidence of the care with which it has been edited is found in every section. The Directory is, as usual, corrected close up to date, and though no new feature has been introduced in the present edition, a considerable addition to the number of registered telegraphic addresses and telephone numbers has been made in the Commercial division. The map is again strengthened by being mounted on linen.

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—A meeting of the Edinburgh Architectural Association was held on the 18th inst., Dr. Rowand Anderson in the chair. Mr. G. S. Aitken read a paper by Mr. Thomas Arnold, who was unavoidably absent, on the Mausoleum of Halicarnassus—the tomb erected by Queen Artemisia in honour of Mausolus. Mr. Arnold, in the course of his paper, explained that he had observed in Sir Charles Newton's plans three piers adjoining the excavation foundation, and that on examining these he had found a relation between them and the intercolumniation. From this he had started to restore the whole building. Pliny's dimensions he had taken as the basis of the restoration, but the height which Pliny gave was generally given as a hundred and forty feet. Mr. Arnold's contention was that not more than a hundred feet ought to be allowed. In this way the podium or base was contracted to 25 ft. in height instead of 65 ft., which was the dimension in the former restoration. This difference of dimension constituted the principal feature in the restoration of Mr. Arnold, who, by a number of diagrams, showed how the dimensions which he had arrived at could be included within several geometrical figures. Some remarks were made on the subject of the paper by Mr. D. W. Vallance, Assistant Curator of the Museum of Science and Art, who said that there was almost a coincidence in the subject coming before the Association at the present time, as Sir R. Murdoch Smith had secured for the Museum a complete cast of the order of the mausoleum, which would be placed there in a few months. From its height of nearly 40 ft. it was impossible to set up the entire original in the British Museum, where it stood in two parts, and the cast in the Edinburgh Museum would show the order for the first time as it appeared on the original monument at Halicarnassus. Continuing, Mr. Vallance said he thought it unfortunate that Mr. Arnold had not strengthened his case by showing how exactly his restoration of the mausoleum agreed with that worked out by Sir R. Murdoch Smith in 1858, while he was engaged with Sir Charles Newton in the excavations at Halicarnassus. Referring to Sir R. Murdoch Smith's official report to Parliament in the Blue Book for 1858, Mr. Vallance showed how closely both the description and drawings there given agreed with Mr. Arnold's restoration. The only real point of difference between Mr. Arnold and Sir R. Murdoch Smith lay in the reading of one of Pliny's dimensions, and this difference of opinion affected only a part of the building of which really nothing was known. In all essential points the present restoration was based, Mr. Vallance said, on that made by Sir Murdoch Smith, and entirely confirmed it. On the motion of the Chairman, a vote of thanks was given to Mr. Arnold for his paper.

ENGINEERING SOCIETIES.

INSTITUTION OF CIVIL ENGINEERS.—At the ordinary meeting of this Institution on the 17th inst., Sir Benjamin Baker, K.C.M.G., the President, in the chair, the paper read was on "The Design and Testing of Centrifugal Fans," by Mr. H. Heenan, M.Inst.C.E., and Mr. W. Gilbert, Wh.Sc., Assoc.M.Inst.C.E. The object of the experiments recorded in this paper was to determine the best form of fan-blade and fan-case, and the most economical diameter and speed of a fan, to produce any required volume of air at a given pressure. After referring to some of the practical difficulties involved, an outline was given of the manner in which the performance of a fan should be tested, a blast-fan, 28 in. in diameter, being selected for illustration. A distinction was made between the velocity- and pressure-gauges for various deliveries, and the method of drawing the characteristic curve was explained. The effect of variation in the shape of the blades was next studied, those chosen having tip-angles of 35 deg., 60 deg., and 90 deg. respectively, the fan-centre being 17 in. in diameter. It was shown that the blade having the radial tip gave the best result. The experimental apparatus used for testing the smaller classes of fans was then described. Each fan delivered air through a circular iron tube into a boiler-flue 2 ft. 6 in. in diameter and 18 ft. long. Circular orifices of various sizes were fitted in the flue to form graduated resistances, and the air-velocity was estimated by an anemometer at the open end of the flue. A transmission dynamometer measured the power absorbed by the fan. It was remarked that considerable differences in the velocity of the air might exist at the same cross-section of the delivery tube of the fan, in proof of which drawings were exhibited of the curves determined by experiment and of those obtained from some of the fans tested. The Heenan mine-ventilating fan, tested at Parkend Collieries, had a fan-centre 7 ft. in diameter and 2 ft. wide. This fan was designed to pass 20,000 cubic ft. of air per minute at 3½ in. of water-gauge, and the result was found to agree well with the rules developed by the authors. A variable resistance was provided by closing the mouth of the air-drift to a greater or less extent. The h.p. given to the fan was obtained by indicating the engine. Characteristic curves for tip-speeds of 5,000, 6,000, 8,000, and 9,000 ft. per minute were given. The maximum efficiency was 70·3 per cent. The comparative output of fans of the same type, but differing in size, showed that, if they were run at the same tip-speed and produced the same water-gauge, the air discharge would be proportional to the centre section of the fan, that was, to the diameter multiplied by the width. This being so, if the air discharged from any fan and the corresponding brake horse-power were divided by the area of the centre section, the characteristic curves plotted from these data, with the observed water-gauge, would be the same for all sizes of fans of the same type. It was shown how the dimensions of a fan could be determined from these curves, so that the most economical result might be obtained; and an apparatus was described, by means of which the accuracy of the water-gauge tips, used for the measurement of air pressure and velocity, was tested. To test the facing gauges the following method was adopted:—The tip was moved at a known velocity through air at rest, by causing it to describe a circle of 20 ft. circumference, and provision was made whereby a water-gauge recorded the air-pressure set up. The pressure in feet of air due to a velocity in feet per second, was obtained by dividing the square of that velocity by 64·4; and it was found that a facing-tip, whether conical, parallel, or bell-mouthed, when used in con-

nexion with a water-gauge, would record this amount correctly. Three side-tips, which had been used to determine the compression existing in a stream of air flowing through a pipe, by placing them at right angles to the direction of flow, were next tested. The object was to determine how far these tips were affected by induction. Two of the tips consisted of pieces of pipe, $\frac{1}{4}$ in. bore, and having external diameters of $\frac{5}{16}$ in. and $\frac{1}{2}$ in. respectively. It was found that, owing to induction, the pressure recorded was less than the correct amount by a quantity equal to about 45 per cent. of the gauge-reading, which would represent the velocity of the air-stream in question. The third side-tip had a plate 2 in. in diameter screwed to the end of the pipe, the edges of the plate being bevelled. The readings of this gauge were found to be correct, and it was used in all the experiments recorded in the paper. The tip-speed used varied between 60 ft. and 190 ft. per second. A series of tests made to determine the efficiency of an expanding chimney was then recorded. Air was passed from a fan through a delivery tube into an expanding chimney, the sides of which could be set at any desired angle to the centre line of the tube. The efficiency for any angle was obtained by dividing the vacuum observed at the throat of the chimney, by the calculated vacuum due to the reduction of velocity of the air as it passed from the inlet to the outlet of the chimney. The results of the tests showed that the angle on each side might be as much as 15 deg. without loss of efficiency. The air speed recommended at the chimney outlet was 20 ft. per second, and the efficiency with this speed varied between 0·43 for 6 deg. opening and 0·42 for 15 deg opening on each side.

Illustrations.

WINDOW OF CHAPEL, EMANUEL SCHOOL, WANDSWORTH COMMON.

THE central light of this window was put in to the memory of the Rev. A. Towsey, formerly head master of the school. The two side-lights were filled in commemoration of the tercentenary of the founding of Emanuel Hospital by Lady Dacre—the funds being collected through the energy of the Rev. A. Chilton, the present head master. There is a rose above the centre light, which was filled with glass by a firm, since bankrupt, some years ago. The three angel heads replace some lavatory-glass with "sacred emblems," which the same firm put in three frames intended to act as ventilators, but which failed of their purpose and had to be nailed up.

The canopies are whites on a ruby ground. The Virgin's dress is ruby on yellow in the two side lights, her robe being of two green-blues; in the centre her robe is blue with lining of ruby on yellow, and her dress white and stain. The angel on the left is green and yellow, on the right, white. The Christ is robed in white and stain with ruby girdle. The wise men are—grey-green with deep ruby girdle and turban; white and stain with sleeves of ruby on yellow and blue-green robe, moss-green sleeves and grey-green dress with cloak of blackberry jam colour, which colour appears again in the Annunciation angel's wings and the stripes of the curtain on the other side, which are alternately that colour and green. Joseph is a sort of old-gold colour with green girdle and purplish nimbus. The fountain is white. All the rubies are very streaky and varied. It is, however, very little use striving to describe, in few words, the colour of a window; everything depends upon the quality of the glass and the juxtaposition of the various tints.

"PHILIPHAUGH," SELKIRK.

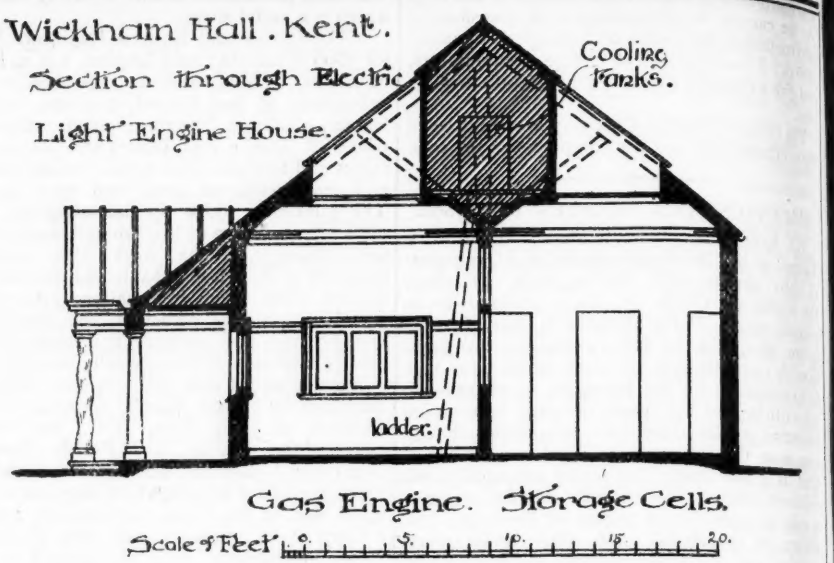
THE extensive additions and alterations that have been in progress at this house during the last three years were completed in August.

Owing to the different levels of the floors, it would be impossible to show correctly the internal arrangements without giving several plans. The principal additions shown in the view given are the east wing and clock-tower, main tower, entrance gable, picture-gallery, and museum.

The other works, not shown, are large winter-garden, the alterations and additions to the kitchen offices, enlarged dining-room, new bay-windows, &c.

The stable offices, lodges, and dairy have either been rebuilt or remodelled.

Extensive ranges of glass have been erected,



and new gardens formed about half-a-mile from the mansion.

A complete electric-light installation, a new system of drainage, and a new water supply are part of the improvements.

The drawing was exhibited at the Royal Academy of this year.

WILLIAM WALLACE.

COMPETITION DESIGN FOR HAMPSTEAD PUBLIC LIBRARY.

THIS design was one submitted in a limited competition, at the request of the Commissioners of Public Libraries for Hampstead, the estimated cost to be about £8,989—the reading-room to accommodate seventy-two people, the lending library forty-two.

A book-store and various offices were arranged for in the basement.

The design is by Mr. Horace Field, and the drawing was hung in the last Royal Academy Exhibition.

HOUSE AT LOWESTOFT.

THE plan of this house is shown on the sketch. The first floor contains six bedrooms and two dressing-rooms, and the attic two rooms.

The materials will be red brick for the lower part, rough-cast on the first floor coloured with ochre, and the roofs covered with green slates. The walls of the ground-floor portion will be hollow.

The site is on the cliffs at Lowestoft, and the sea-front of the house will face south-west.

Mr. Arthur C. Blomfield is the architect.

ELECTRIC LIGHT ENGINE-HOUSE, WICKHAM HALL.

THIS building accommodates the installation for lighting the above-named house, which was illustrated in our issue of November 10, 1894. The walls are lime rough-casted externally with salt-glazed brick quoins and arches. Internally they are faced with colour-glazed bricks. A fixed partition of wood and glass separates the engine-room from the cell-room—the latter being reached by the covered way outside, to cut off the fumes of the acid. The colonnade is executed in wood, painted white, with some old spiral columns worked in. Messrs. Massey & Alpress were the consulting engineers, Messrs. Candler the builders, and Mr. Walter Millard the architect.

The perspective drawing is by Mr. A. E. Perkins.

PRIVATE BILLS, SESSION 1896; AND DEPARTMENTAL PROVISIONAL ORDERS.

AN unusually large number of measures have been prepared for the coming Parliamentary Session. It is stated in the *Times* that there are 62 railway Bills as compared with 51 of last year, and that 114 relate to water, gas, and electrical lighting, whilst 15 out of the remaining 82 deal with tramways. We give below an epitome of the more important projects, as detailed in the official "Notices" published in the *London Gazette*:—

MUNICIPAL, BUILDING, SANITARY, AND OTHER LOCAL IMPROVEMENTS.

BILLS.—*Westminster Improvements* (*Parliament-street, &c.*): to vest in a company the powers conferred by the Westminster Improvements Acts of 1887, 1890, and 1892; extension of time and revival of powers for completion of the works; further lands between St. James's Park and Parliament-street, and Charles- and Great George-streets; to stop up Delahay-street; and for a new street instead to join Charles- and Great George-streets, on the west portion of the ground.* *James-street Area* (*Kensington Improvements*): two new streets from Kensington-square, south-east corner, to Kensington Court and the west end of St. Alban's-road; widening of Charles-street and west end of St. Alban's-road. *Petersham and Ham Lands and Footpaths*: To what we have already said (pp. 385-6 *ante*) about the arrangement between the Dysart Trustees and Richmond Corporation we may here add that the Bill vests in the Conservators of the Thames and the Trustees the tow-path along the Surrey side of the river between Petersham-lane and Teddington Lock, empowers the Trustees to relinquish all rights in Ham Common, which it vests in the Urban District Council of Ham for public use and enjoyment, and extinguishes lammas and other commonable rights, with compensation, over certain lands in the two parishes.

By the following Corporations:—*Brighton*: two retaining walls between Madeira-road and Paston-place, about 1,030 yards, and one eastwards thereof, to the parish boundary; swimming and other baths; to open North Steine Enclosures as a public walk or pleasure-ground; provisions with respect to slaughter-houses, and purchase thereof, infectious diseases, insanitary and condemned dwellings; advertisements in streets and on hoardings; the re-erection and roofing of buildings and their conversion into dwelling-houses or change of character of the same; and for prohibiting the use of steam or mechanical musical instruments or whistles or horns within or near the borough. *Darlington*: extension of boundaries to include Blackwell and portions of Cockerton, and Haughton-le-Skerne; transfer of Northgate, Cockerton, Mowden, Haughton, and Church-end Bridges; improved water supply, and building regulations: regulation of overhead wires, posts, and apparatus; regulation and prohibition of street processions, the sounding or playing of musical instruments, and of singing in the streets, and prevention of street cries;† purchase of the Stockton and Darlington Street Tramways Company; exemption of the Edward Pease Public Library, the Technical Institute of the Corporation, and the public parks from rates and assessments. *Stafford*: conversion of all pail-closets, privies, and the like into water or slop-water closets or other closet accommodation on the water carriage system, with further and better provision in respect of sewerage, drainage, and sanitation. *Huddersfield*: for tramways; street widenings and improvements; sanitary regulations, including the removal or filling up cesspools and ashpits, the conversion of tub-closets and privies into water-closets, and to compel the use of the water-carriage system of drainage in all new buildings; to further provide for the prevention of the

* In our "Note" of November 30 (p. 391, *ante*), we mentioned how the Government propose to deal with this site.

† The Association for the Suppression of Street Noises has drafted a Bill to provide relief for places where by-laws are not or cannot be in operation.

spreading of infectious diseases by, *inter alia*, books issued from public libraries, and for control with respect to vendors of ices and the materials they use: to prohibit the suspension of electric wires over, across, or along any street, to compel the same being placed underground, and for the compulsory removal of those at present existing. *Manchester:* various street improvements; widening of Market-street, Crumpsall-lane, and Ashley-lane; to take over Monsall Hospital in Newton; and to transfer Partington and Carrington townships from district of supply of the North Cheshire Water Company to that of the Corporation. *Burton-on-Trent:* to take over and maintain Burton Bridge as a borough bridge; widen and improve Little Burton Bridge; public bathing places on the Trent; certain sanitary measures; and to enable the Corporation to maintain their organ in the Town Hall, and appoint and pay the organist. *Chester:* a weir or tidal dam across the Dee, dredging powers, prevention of pollution of river above the weir, and to raise, remove, or alter the present causeway. *King's Lynn:* to cover over the Mill Fleet between Lady Bridge and the London-road; new sewerage works; and to empower them to fix the level of the ground floor of any new building, and prohibit the construction of any cellar or basement story in any such building. *Leamington:* to take over the Jephson Gardens as pleasure grounds; regulations as to street musicians, people betting in public streets, and sky signs, and advertising vehicles and hoardings.

By the following Urban District Councils: *Weston-super-Mare:* to purchase the entire undertaking (with the island) of the company known as "Knightstone, Weston-super-Mare"; construct marine lakes in the bay by means of sea-walls, and a pier about 1,130 yards long; widen and extend Marine Parade; regulations as to hoardings, organs, or other musical instruments worked by steam, music and singing in the streets, smoke-test for drains, advertising vehicles, sinks and drains for dwelling-houses, burning of refuse, lopping of trees, &c., overhanging public streets, removal of offensive urinals, and requiring persons engaged in washing or mangling clothes to furnish lists of their customers. *Bilston, Staffs.:* extension of area of water-supply; "to restrict, license, or regulate advertising hoardings, sky-signs, advertising vehicles; to prohibit indecent advertisements on walls and hoardings, and to make other provision in regard to street advertisements," and to make further and better provision in regard to the prevention and spread of infectious diseases and other sanitary matters and things. *Wallasey:* to take about 6½ acres of foreshore of the Mersey; make a promenade and embankment between the existing promenade and the "Ferry" Hotel, New Brighton; and lay out gardens and open spaces. *Barry, Glamorgan:* to take over Cadoxton Common, 28 acres, and lay it out as a park or recreation-ground; extension of limits of gas and water supply; new waterworks; licensing of plumbers. *St. Anne's-on-the-Sea, Lancs.*: provisions similar to the foregoing; also for the employment of boatmen for the protection of bathers, prohibiting the exposure of clothes for drying purposes in front of houses and streets, and the placing stalls, &c., outside shops, and the placing of notices, placards, &c., outside windows. *Malvern Link:* to extend district by inclusion of about 228 acres of Cradley, Herefordshire, and to include such part of Cradley within the area of the county of Worcester; construct new waterworks, having reservoirs and filter-beds, in Colwall, Mathon, and on the Malvern Hills, for which works it is proposed to take about 2½ acres of the Hills in the parishes of Mathon, Colwall, and Cradley. *Caerphilly:* a Bill (by Mr. David Lewis) for erection of new markets and slaughter-houses in Caerphilly, and purchase thereof by the Urban District Council. *Newcastle-on-Tyne:* for the rebuilding of Redheugh Bridge, which joins Westgate and Gateshead.

NAVIGATION: HARBOURS, DOCKS, PIERS, CANALS.

BILLS.—*Cowes:* to incorporate a body of Commissioners or Trustees for the management, maintenance, and improvement of Cowes Harbour, to be appointed by the Urban District Councils of Cowes, and East Cowes, Newport Corporation, the Royal Yacht Squadron, Royal London Yacht Club, and Southampton, Isle of Wight, and South of England Royal Mail Steam Packet Company. *Borrowstounness Harbour Commissioners:* to sell and transfer their existing undertaking for a harbour and docks to the North British Railway Company. *Swansea Harbour Trustees:* new entrances to the half-tide basin of the Town Float, with new lock, and for deepening. *Brading Harbour and Railway:* to determine limits of harbour; to make a new cut, with quay wall. *Windsor Docks, Cardiff:* a company for sea-walls, docks, railways, &c., on the Penarth Flats. *Preston Corporation (Ribble Navigation):* training walls, or embankments, at Lytham, in the estuary of the Ribble. *Midland Railway:* a harbour at Heysham, Morecambe Bay, with two piers, about 1,100 yards and 1,130 yards long, at the Near Naze, and Red Nab, with a jetty, about 430 yards long. *Llanelly Harbour and Burry Navigation:* embankments or training walls, a new dock and cut for the River Lleidi, railways in Llanelly parish.

PROVISIONAL ORDERS, BOARD OF TRADE.—*Porthgain (Pembrokeshire):* a wet dock in the harbour, with refreshment rooms, shops, and approaches, near the harbour. *Studland (Dorset):* by Mr. W. Ralph Bankes, of Kingston Lacy, Wimborne, for a pier, about 500 yards long, with other works. *Tenby Corporation:* a pier, jetty, or landing-stage, near Castle Hill. *Birchington:* a pier, about 1,000 yards long, with a cross-head 70 yards long. *Weston-super-Mare:* to lengthen the present jetty; and a pier about 390 yards long, from the west end of Birnbeck Island. *Bexhill Promenade and Landing Pier:* by Mr. John William Webb, for a promenade and pier, about 1,400 ft. long, westwards of the Coastguard Station, with assembly rooms, shops, baths, and the like.

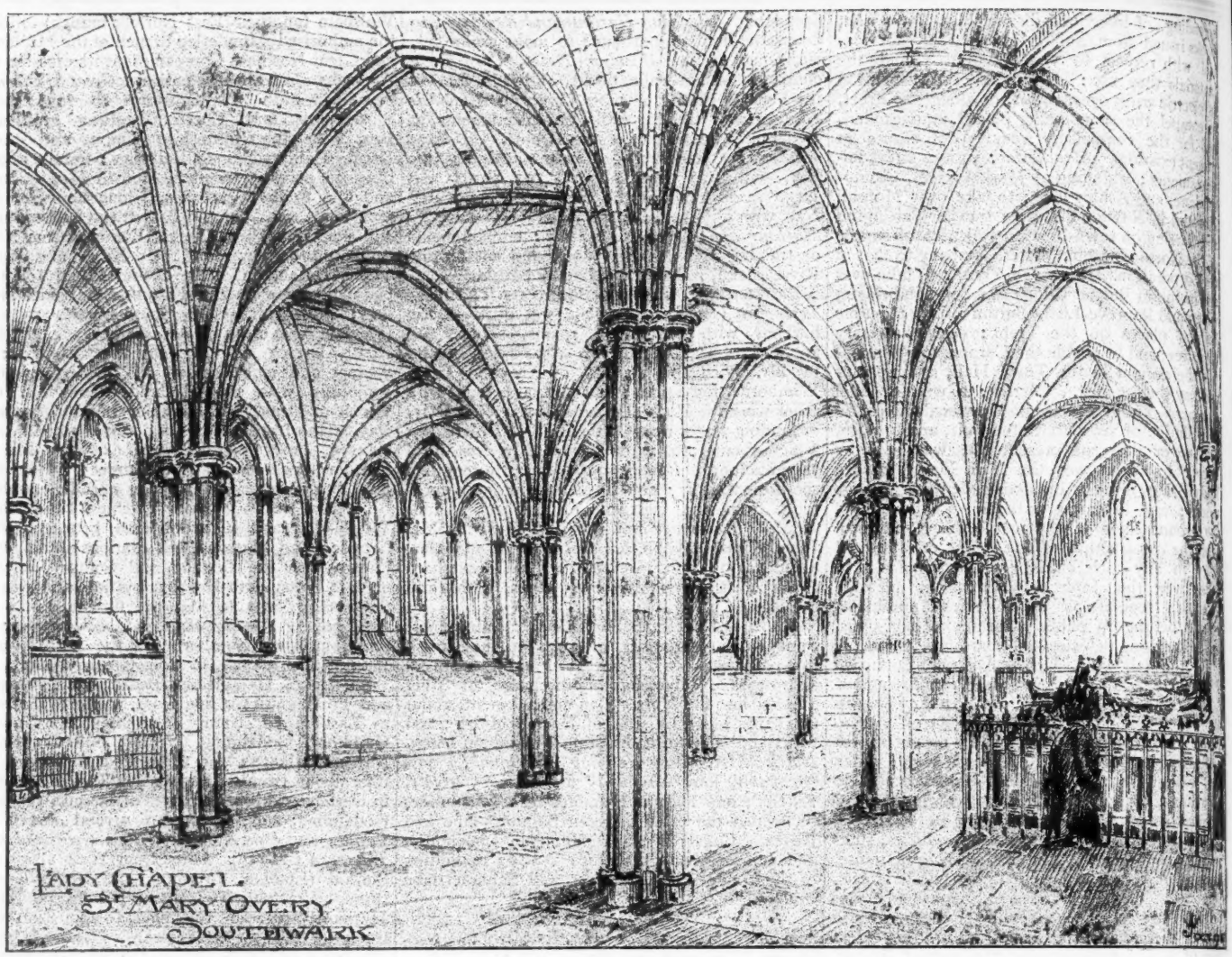
BILLS.—*Manchester Ship Canal:* filling up of some tidal openings; railway on the Irwell tow-path, between Trafford-road and the Ordsall Soap-works; diversion of discharge of river Weaver into the Mersey; an embankment, about 650 yards long, by side of Norton Marsh; and to extend time for completing Warrington Dock. *North Metropolitan Railway and Canal:* a new street to join Medland- and Narrow-streets, Ratcliff; new locks at Salmon's-lane, Limehouse; to deepen the canal between Salmon's-lane and Regent's Canal Dock, widening in Limehouse, and at Park-road, St. John's Wood; rebuilding of the Commercial-road East and Salmon's-lane bridges.

RAILWAYS.

BILLS.—*London and South Wales:* a line from the Barry Railway, Cardiff, to the Metropolitan at Great Missenden (Bucks), and the Midland at Hendon, passing through Newport, Chepstow, Kempsford, Lechlade, Malmesbury, Cricklade, Castle Eaton, Cumnor, Bampton, Stanton Harcourt, Cowley, Iffley, Oxford, Cuddesdon, Bledlow, Princes Risborough, and Great and Little Hampden, with a branch from Bedlow to Wycombe, Beaconsfield, Chalfont St. Peters, Denham, Harefield, Ruislip, Pinner, Harrow, and Hendon, and connecting lines with the Manchester, Sheffield and Lincolnshire, Taff Vale, Brecon, and Merthyr Tydfil, Great Western, Midland, and Midland and South-Western Junction Railways. *Metropolitan District:* a line from South Kensington Station to the junction of Pelham-street with Fulham-road, and stopping-up of Pelham-crescent and Pelham-street. *Metropolitan:* to widen their lines in Harrow and Aylesbury parishes, reconstruct their joint station with the Great Western at Aylesbury, enlarge Moorgate-street Station, and acquire lands for making openings to ventilate their line, at and between Gower-street and Praed-street Stations. *Baker-street and Waterloo:* extension of time under their Act of 1893, and a railway (electric or cable) from Upper Baker-street to the Manchester, Sheffield and Lincolnshire line, at Harewood-square, N.W. *City and South London:* extension of time under the Act of 1893, additional lands on each side of Borough High-street, and to alter the construction of the Lombard-street Station. *Watford, Edgware and London:* a company for a railway from Watford (London and North-Western) to Edgware, with branches to Mill Hill Station (Midland) and Edgware Station (Great Northern), passing through Bushey, Aldenham, and Little and Great Stanmore. *Ealing and South Harrow:* lines from their authorised railway in Harrow to Hillingdon, Beaconsfield and Wycombe; to Willesden; and to join the Regent's Canal, City and Docks railway at Warwick-road, Paddington, taking about ten acres of the common lands known as Wormwood Scrubs and the adjacent Old Oak Common. *Ilford, Barkingside and Chigwell Row:* to incorporate a company for railways from Ilford (Great Eastern) to Chigwell Row, and to Townswood Hill in the grounds of the London County Asylum at Claybury. *South Eastern:* to widen portions of their London and Suburban railways, including the Charing Cross line, and at Rotherhithe and Deptford. *Great Eastern*: a line from North Walsham (on their East Norfolk branch) to join the authorised Mundesley branch of the Midland and Great Northern Companies at its crossing of Antingham-road in that parish. *Great Western:* new Lines in Denbighshire to join their Shrewsbury and Chester Railway at Ruabon, with the Shropshire Union and their Legacy Colliery Branch Railways: to take about nineteen acres of common land in Hawkesbury and Old Sodbury parishes, Gloucestershire, for four lines from Wootton Bassett to Old Sodbury, and Berkeley New Docks Branch, from Old Sodbury to Patchway on their Bristol and South Wales Union, and from Stoke Gifford (on the last-named new line) to Filton on the said Union line: lines from their South Wales railway (Pengam level crossing) to Roath Dock, and the Roath branch of the Taff Vale Railway; a viaduct and embankments at Bickleigh; and, conjointly with the Midland, a line, in the Forest of Dean, from the Severn and Wye railway to the Iron Works, Cinderford (three Bills). *London, Brighton, and South Coast:* a line in Deptford for crossing Grove-street Hill on the level; to widen their Croydon and Balham line between Streatham and Croydon, and their Wimbledon and Croydon line between West Croydon and Merton Park Stations; and, conjointly with the London and South Western, enlarge Portsmouth Harbour Station, and extend the carriage-way to join the floating pontoon. *Portsmouth, Basingstoke, and Godalming:* a line from Monk Sherborne on the Reading and Basingstoke branch of the Great Western, to Basingstoke, Hambledon, Bedhampton, Portsea, and Portsmouth; a line from Shalford, Surrey, to East Tisted, county Southampton, through Guildford, Godalming, Hedley, Selbourne, and Newton-Valence; for these it is proposed to take about twenty acres of Hankley Common, in Elstead, with fifteen acres of lammas lands at Godalming, and to stop up several streets in Portsea and Portsmouth. *West Grinstead and Hayward's Heath:* a line from West Grinstead Station (London, Brighton, and South Coast) through Cowfold, Twineham, Bolney, Lindfield, Hurstpierpoint, and Cuckfield, to a junction with the latter railway at Hayward's Heath. *Rother Valley:* a light railway from the South-Eastern at Salehurst, Sussex, through Ewhurst, Northiam, Newenden, and Rolvenden, to Tenterden. *North-Eastern:* a line from Killingworth on their Newcastle and Berwick Railway to Gosforth; a line from Cottingham, on their Hull and Scarborough Railway, to join the Hull, Barnsley, and West Riding Junction at Springbank-road. *Basingstoke and Wokingham:* a line from Basing (London and South-Western) to Wokingham on the Reading and Reigate branch of the South-Eastern, passing through Monk Sherborne, Sherfield, Hartley, Bramshill, Eversley, Finchhampstead, and Barkham. *Marlborough and Grafton:* a company for a line from the Midland and South-Western Junction Railway at Preshute, near Marlborough, through North and South Savernake, and Wootton Rivers, to join that line at Wolfhall, and thence to Grafton Station. *Bideford, Westward Ho! and Appledore:* a company for a line to connect those places running from Bideford Bridge through Northam. *Lowestoft and Yarmouth:* a light railway from Station-road, Gorleston, to Lowestoft, about nine miles long, passing through Southtown, Blundeston, Gunton, and Oulton. *East and West Yorkshire Union:* purchase of the South Leeds Junction, and its dissolution. Amalgamation of the North-Eastern and Hull, Barnsley, and West Riding Junction, and winding up of the latter. *Cawood, Wistow, and Selby:* a light railway from Cawood through Wistow, Selby, and Brayton to join the Leeds and Selby line at Brayton-gates, W.R. *Newport, Godshill, and St. Lawrence:* to extend their authorised railway by a line from Godshill to Steephill Castle grounds, Isle of Wight. *Port Talbot Railway and Docks:* several short lines in Glamorgan; purchase of the Morfa, and the Cefn and Pyle Railways; completion of the Dimbath branch of the Great Western, failing its completion by the latter, and to buy about 20 acres of common land in St. Bride's Minor and Llangeinwyr parishes. *Bute Docks:* amalgamation of the Rhymney Railway Company with the Bute Docks Company, and dissolution of the former; to construct lines from Cardiff up the Taff and Aberdare Valleys, for which are scheduled 3 acres of Gelligaer and Craigevanleyshon Commons.

TRAMWAYS.

BILLS.—By the Corporations of Swansea, Huddersfield, and Newcastle-on-Tyne—for new lines. Companies for twenty-four tramways in Sheffield, Rotherham, Ecclesfield, Handsworth,

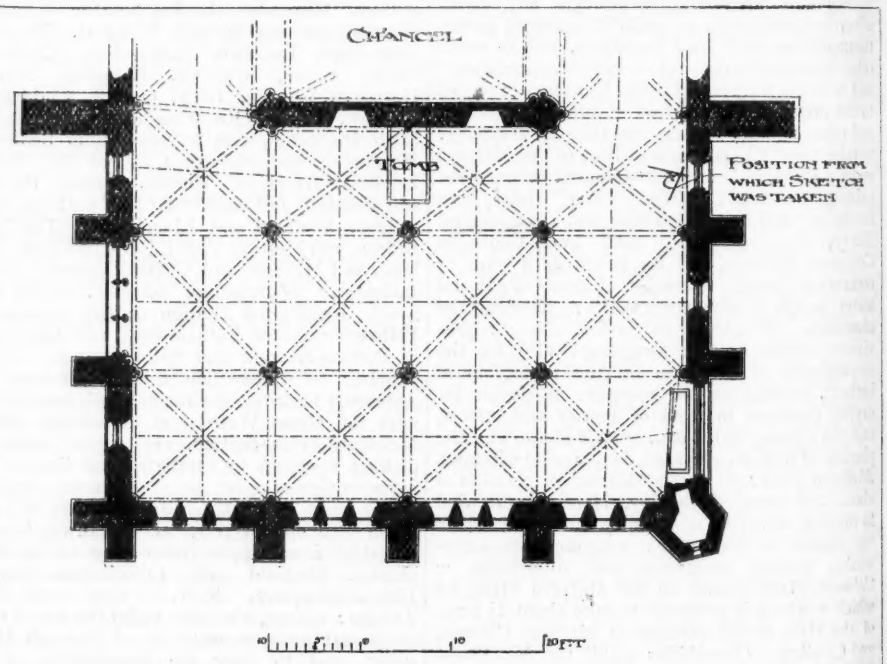


and other places; in Halifax and around; from Kidderminster to Stourport; from Derby to Ashbourne. *London Tramways:* To double their lines in Upper Kennington-lane, Brixton-road, and Camberwell New-road, and for a line from Upper Kennington-lane over the new Vauxhall Bridge, to the end of Vauxhall Bridge-road. New lines in the Blackpool, St. Anne's, and Lytham districts; for Blackpool and Fleetwood (for which the overhead system may be adopted); from Stone, through Dartford, Darenth, Farningham, and Eynsford, to Lullingstone, from Sutton-at-Hone to Wilmington, and from Eynsford to Swanley Junction Station, with a pier about 100 yards long, at the river-wall, Stone.

Provisional Orders, Board of Trade.—Lines in Ashton-under-Lyne and district; by the Corporations of Manchester (additional), Kingston-on-Hull, Blackpool, Dover (gauge 3 ft. 6 in.), Longton (gauge 4 ft.), and Plymouth. For street-tramways (4 ft. gauge) in Burslem, Tunstall, Stoke-on-Trent, Hanley, and the Potteries district generally; for Bristol, by the Bristol Tramways and Carriage Company; and extension through the North and South Camps and parade ground, of the Aldershot and Farnborough lines.

Electricity and Electric Lighting.

Provisional Orders, Board of Trade.—To produce, store, and supply electricity, electrical energy and power by the Corporations of Bangor, Bath, Devonport, Folkestone, Gloucester, Godalming, Huddersfield (extended area), King's Lynn, Liverpool, Manchester (extended area), Margate, Middleton, and Wells; St. Mary, Newington, and Battersea Vestries; the Urban District Councils of Colwyn Bay and Colwyn, Cowes, Keswick, Kettering, and Sale, co. Chester. By the following companies: *County of London and Brush Provincial*—within the Districts of the St. Saviour's Board of Works; St. Mary, Newington; St. Mary, Lambeth; St. Giles, Camberwell; and St. Mary, Battersea; Lincoln, and Ipswich. *J. C. Howell:* Merthyr Tydfil. *Newmarket Electric Light:* Newmarket. *Liverpool District Lighting:* Allerton, Little Woolton, Much Woolton, Childwall, and Garston, Lancashire; Great Crosby and Waterloo-with-Seaforth. *British Insulated Wire Company:* Prescot and Whiston districts. *Windermere and District Electricity Supply Company:* Ambleside. *Ilfracombe Gas Company:* Ilfracombe. *Guildford Gas Light and Coke Company:* Guildford. *Bournemouth Gas and Water:* Bournemouth and vicinity. *Bexhill Water and Gas:* Bexhill and neighbourhood. *Bedford Electric Light Company:* Great Berkhampstead and Northchurch. *City of Bath Electric Lighting and Engineering:* City of Bath. *Great Western Electric Light and Power:* in the Urban Districts of St. George, Kingswood, and Stapleton, and the Rural District of Warmley, Bristol. *Altrincham Electric Supply:* parish of Ashton-on-Mersey. *Keswick Electric Light:* in Keswick and parts of other townships in parish of Crosthwaite.



Lady Chapel or Retro-choir, St. Mary Overy.—Plan.

Water Supply.

Bills.—*London Sea-water Supply.*—A new company for conduits, reservoirs, pumping-stations, and other works between Lancing, in Sussex, and London. The intake will be at Lancing, the reservoirs at Lancing, Bramber, and Epsom. The lines of pipes, with several conduits on the way, will pass through the parishes, townships, or extra-parochial and other places following, namely: Sompting, Bramber, Steyning, West Grinstead, Horsham, Dorking, Mickleham, Leatherhead, Epsom, Ewell, Cheam, Sutton, Wimbledon, Mitcham, Tooting, Streatham, Clapham, Battersea, Chelsea, Kensington, St. George, Hanover-square, St. Martin-in-the-Fields, St. James, Westminster, St. Clement Danes, the Temple, St. Bride, St. Sepulchre, St. Botolph (Aldersgate), St. Luke, Shoreditch, Bethnal Green, Paddington, St. Marylebone, St. Pancras, St. George, Blooms-

bury; St. Andrew, Holborn, Gray's Inn, Hatton Garden, and Clerkenwell. The sea-water will be conveyed under the Thames by a conduit from Battersea Bridge-road to the intersection of Cromwell-road with Queen's-gate. There will be conduits at Holland Park-avenue, Mount-street, Snow Hill, Victoria Park (Bonnor Hall Bridge entrance), Portman-square, Queen's-gate (north end), Northumberland-avenue (north end) and at the junction of Great College-street with Abingdon-street, Westminster. *New River Company:* new wells, pumping-stations, aqueducts, and lines of pipes in the parishes of Ware Rural, Stapleford, Tewin, Essendon, St. John Rural, Great Amwell, Little Berkhampstead, Bayford, Brickendon, Hoddesdon, Enfield, Cheshunt, and Edmonton. There are to be new reservoirs at Enfield Chase, Southgate, and Wood Green; new filter-beds and a pumping station in Stoke Newington; the New River is to be widened on both sides at several places along its course, and the company propose to take an aggregate estimated at thirty acres of common land known as the King's and Hartham Meads, in the parish of St. John Urban, Hertford. They will also discontinue, as a waterway, the water-way in Enfield and Edmonton, between Southbury-road and Bush Hill sluice, diverting the water into the main channel, and enlarge their reservoir, by the pond, on Hampstead Heath. *East London Waterworks*: The London County Council promote a Bill to make further provision with respect to the supply by this company, and for securing more regular and constant supply at a higher level. *Kent Water Board*: a water board for the Urban Districts of Beckenham, Bromley, Dartford, Erith, and Bexley, with the Rural Districts of Bromley, Dartford, and Sevenoaks, the purchase by such board of the Kent Waterworks Company, and the vesting in them of so much of the Lambeth Company as is situated in Kent (Beckenham). This Bill formulates the policy advocated by the local authorities concerned when opposing, last session, the London County Council (Water Transfer) Bills. *Staines Reservoirs:* a joint committee nominated by the proprietors of the New River, West Middlesex, and Grand Junction Companies, for various purposes, to include two reservoirs at Stanwell, and one (about seven acres in area) at Hampton, a pumping-station in Stanwell, and to take about twenty acres of common lands in Staines parish for aqueducts from Wyrardisbury to Hampton, and in Staines.

ADDITIONAL WORKS AND EXTENSION OF AREA OF SUPPLY.—Portsmouth, Huddersfield, Eastbourne,* Brighton, and Sheffield (for Barnsley, Rotherham, and Doncaster) Corporations; and the following companies: Southwark and Vauxhall, East Surrey, Eastbourne, Bournemouth, Aldershot, Bexhill, East Warwickshire, Fylde, Aldrington Estate, West Brighton, and Ystrad—which last-named company propose to utilise Llynfawr Lake, at Rhigos, and to take 120 acres of Forest Fawr and seven acres of Hirwain common land. The Birmingham Corporation promote a Bill for more lands and deviations of the authorised aqueduct.

PROVISIONAL ORDERS, BOARD OF TRADE.—New companies to supply the Laindon Hills district; Amersham, Beaconsfield, Chenies, Chalfont St. Giles, and around; and to Mr. J. T. Green, of Ampthill, for Ampthill, Maulden, and around.

GAS.

BILLS.—*Sandwich Corporation:* and to purchase the Sandwich Gas Light and Coke Company.† *Cheltenham Corporation:* extension of area of supply, and purchase of the Cheltenham Gas Light and Coke Company. By the following companies:—Bournemouth Gas and Water, Ilfracombe, Bexhill Water and Gas, Newcastle-on-Tyne and Gateshead, and Cheltenham Gas, for additional works and extension of areas.

PROVISIONAL ORDERS, BOARD OF TRADE.—Matlock Bath Gas Light and Coke, new works and extension of area. LOCAL GOVERNMENT BOARD.—*South Molton Corporation:* to buy and work for heating and motive power the undertaking of the South Molton Gas and Coke Company. *Great Driffield:* to authorise the District Council to acquire the Driffield Gas Light Company, and extend the existing works. The Urban District Council of Matlock Bath and Scarthin Nick apply for a Bill for gas-supply, and purchase of the Matlock Bath Gas Light and Coke Company.

* With purchase of the Eastbourne Waterworks Company.
† They also apply to the Local Government Board for a Provisional Order to this intent.

THE LADY CHAPEL OR RETRO-CHOIR, ST. MARY OVERY.

THE restoration of the Retro-choir (commonly, but erroneously, called the Lady Chapel) was carried out by Gwilt in 1832, and is a remarkably good specimen of such work at that date.

It is to be regretted that externally a Yorkshire stone was used which has proved to be very ill-fitted to withstand the influence of London air, and that internally so much of the repair was executed in cement and plaster, and the old chalk filling in of the groining entirely hidden under a coating of the latter, marked with lines in such a manner as to rob the old groining of much of its charm. These defects in the interior have now been remedied. The Lady Chapel (latterly called the Bishop's Chapel, the tomb of Bishop Lancelot Andrewes being the principal feature in it), stood eastward of the second bay to the south; the lines of the jambs of the arch from the Retro-choir can still be seen. When it was pulled down the tomb of the Bishop was moved into the position it now occupies at the back of screen behind the high altar.

It is now proposed to move it to a more suitable position under the easternmost arch of the south aisle of the choir.

At the north-east corner of the Retro-choir are the remains of what is supposed to have been an Easter sepulchre.

The floor of the whole is about 12 in. above the ancient level, which, for several reasons, it was impossible to restore in the works now going on.

Correspondence.

To the Editor of THE BUILDER.

ELECTRIC LIGHT SUPPLY.

SIR,—I have read with interest your notes on the Edinburgh Electric Lighting Works, especially those relating to the introduction of high voltage lamps. The gain to the supplying agents is manifest. The gain to the consumer is, to say the least, doubtful, and where corporations or vestries undertake the work, I think the latter deserve some consideration. This house is supplied by the St. Pancras Vestry, but though the mains were laid several months before I adopted the light, no notice was sent of any intended change in the conditions of supply, and the house was partly wired as for 110 volt lamps, when I found out the change. Unlike Edinburgh, there was no option in the matter, or most certainly I should not have agreed to use the higher pressure.

The candle-power does deteriorate more rapidly (unless that is, the Vestry do not maintain the proper voltage in their mains), and I have had to change some after about 500 hours' use. There are other drawbacks to their use besides the higher charge (English lamps are 2s. each.)

There are no five c.-p. lamps to be had; there are no obscured lamps yet made. The lamps are larger than the 110 and 100 volt lamps, and will not go in many shades.

The meters are not specially made for the higher voltage, though this may be after all no real objection. "ST. PANCRAS."

P.S. I enclose card.

PORTLAND CEMENT IN HONG-KONG.

SIR,—I am sending you, attached to this letter, the results of several tests of Portland cement manufactured in Hong-Kong by the Green Island Cement Company.

This being a new and comparatively unknown brand, it occurred to me that these results might be useful to your readers in India and the Far East, who, like myself, have hitherto preferred to use the better-known English brands to a local manufacture of which we know so little.

At present I believe the price in Singapore is about the same as home-manufactured cement, but with an increased demand it should be cheaper, especially in China.

The tests were made by Mr. J. W. B. Maclaren, A.M.Inst.C.E., and myself, from a recent consignment, the cement being taken from different casks as they stood in the godown.

REGENT A. J. BIDWELL.

Singapore, November 16, 1895.

The Student's Column.

METALS USED IN BUILDING.—XXVI.

METALLIC PAINTS.

UNDER this heading we shall give a brief review of divers mineral substances used in the manufacture of metallic paints, including also some pigments not, strictly, of metallic origin.

White Lead.—This is by far the most important pigment employed by the house-painter; it forms the base of practically all the lighter tints, and is used generally to impart a "body" to the colour. The pig-lead from which it is produced is obtained from lead-refiners, and the substance is then corroded. The most common process employed is known as the Dutch method, the essential features of which are as follow: The pig-lead is cast into perforated buckles, 7 inches in diameter, and about one-eighth of an inch in thickness. These are packed in earthenware pots of suitable size, into which a dilute solution of acetic acid is poured. The pots are then piled up into huge bins or stacks, and when the stack is completed it is covered with spent tan bark or manure, and then left alone for about thirty days. A chemical decomposition of the lead ensues in consequence of the heat generated, and some of the metallic pig becomes converted into white carbonate. On the contents of the pots being removed, the material is found to be partially lead carbonate (white lead) and partially unconverted pig lead. The mixture is thrown into a revolving drum, which retains the metallic portion and permits the white lead to pass through a screen. The quantity of pig-lead converted into white lead never amounts to more than from 60 to 70 per cent.; there is always a residuum of unconverted lead.

But the composition of white lead is by no means constant. The amount of lead oxide varies from 84·7 to 86·5 per cent., with correspondingly differing amounts of carbonic acid and water.

The white-lead of Kremnitz, Hungary, has the reputation of being the finest in the world. The process employed in its manufacture may be briefly described. The oxide of lead used if in lump must first be ground to powder. To every hundredweight of lead ten quarts of No. 24 acetic acid are added, with sufficient water to make consistent dough or paste. This is spread upon trays covered with sheet lead, which are placed one above another, provision being made for the free admission of gas between each. Carbon dioxide, produced by the combustion of coke, is then admitted to the chamber, the gases being first washed by passing through filters formed of wet scraps of lead arresting smut, which would impair the colour of the lead. Where sulphur is suspected in the coke, the water is impregnated with some alkali. The absorption by lead oxide of the carbon dioxide present in the gas is shown by a gradual change of colour to white. The operation is complete in from three to six days, during which time the lead is stirred up by means of rakes. The material is spread in store-rooms and permitted to dry, then ground with water in a mill, floated, redried, and is then ready for use.

Zinc white.—This pigment, second only to white lead in importance, is extensively manufactured, especially in the United States. It is an artificially-prepared oxide of zinc made by a very simple process. The zinc ore is mixed with hard coal, reduced and vaporised by means of heat. A current is then passed through the vaporised zinc, and white flakes of the oxide result, which are collected in bags. In countries not possessing sufficiently hard coal, the vapour is obtained directly from bar zinc, or spelter, and freshly prepared oxide is submitted to hydraulic pressure and a considerable amount of heat at the same time. A whiter oxide results on account of no coal-dust or smoke coming in contact with the pigment during the course of production. In

No. of Brick.	Date of Making.	Date of immersion in water.	Date of Test.	Area of Brick.	Broke under a tensile strain of	Quantity of Water.	Remarks.
1	Nov. 4	Nov. 5	Nov. 12	1-in.	425 lbs.	Very wet.	Set quickest.
2	,,	,,	,,	,,	520 ,,	,,	,,
3	,,	,,	,,	,,	461 ,,	Less water.	
4	,,	,,	,,	,,	340 ,,	Less than 3.	
5	,,	,,	,,	,,	385 ,,	,,	Slowest set.
6	,,	,,	,,	,,	360 ,,	,,	Fracture showed signs of foreign matter.
7	,,	,,	,,	,,	450 ,,	More than 4, 5, & 6.	
8	,,	,,	,,	,,	450 ,,	Less than 1 and 2.	
9	,,	,,	,,	,,	479 ,,	,,	
10	,,	,,	,,	,,	534 ,,	,,	Most carefully made brick.

The average weight per struck Imperial bushel was 103·5 lbs.

consequence of the increased demand and higher price of labour, the value of the pigment is slowly increasing in the United States.

The zinc white of Belgian origin is imported in three grades, known, respectively, as "Paris green seal," "Paris red seal," and "Antwerp red seal." These are employed in the manufacture of the better class of paints.

Barytes.—This mineral, known also as heavy spar, barite and barium sulphate is abundant in many parts of the country, and is largely used in making different paints. It is very frequently found in pockets, the extent and homogeneity of which are always unknown quantities. Consequently the quality is variable, and it requires knowledge of a very special character to gauge their relative values. The mineral is prepared in several ways, the product of one of which is known as "floated barytes." In this the ground mineral is floated in long sluice-ways and that which floats the farthest is the finest in grain. This variety of barytes is found to be much finer than that which is simply ground, but it is liable to be slightly discoloured, as it readily takes in impurities from the water with which it is treated.

Blanc fixe.—This is known also as permanent white and barytic white; it is barytes artificially prepared. The crude heavy spar is thoroughly ground and mixed with some carbonaceous material, such as coal-dust, and some chlorine compound, generally the residue from chlorine stills. This mixture is treated in a reverberatory furnace for an hour. The resulting mass is lixivated, and the liquor, which is a solution of almost pure barium chloride, is drawn off and mixed with sulphuric acid. The resulting precipitate, which is barium sulphate in an exceedingly fine state of division, constitutes *blanc fixe*. It is generally sold in pulp, that is, ground in water. Its covering capacity is much greater than that of natural barytes.

Terra alba is a white pigment made of ground gypsum.

China clay, from its purity, being normally snow-white when carefully prepared, is used to some extent in paint-manufacture.

Whiting, or ground earthy carbonate of lime, is used for similar purposes. In general there are four grades of this substance, viz., common whiting, gilders' whiting, extra gilders' whiting, and (in the United States principally) American Paris white.

Paris white.—This is the name given to the white colouring substance prepared by grinding hard limestone of greater specific gravity than chalk. The rock is known technically as cliff-stone.

Vermilion.—When properly so-called, vermilion is an artificial sulphide of quicksilver. A common process employed in making it consists in bringing quicksilver, sulphur, potassium hydroxide and water together in a revolving drum. The mixture is gently heated until 115 deg. Fahr. is reached; the temperature is then kept constant, and the reddening action proceeds. The composition of real vermilion is, approximately, mercury 86·3, sulphur 13·7.

A number of pigments known as vermilion are in the market under the name of "Persian red," "Persian scarlet," "American vermilion," &c., which are not entitled to the name. "Imitation vermilion" is an aniline colour thrown on a lead body, which would not appear always to be of a very durable description, the colour being liable to change. There are numberless names for it, such as "Columbian red," "zubia," "ruboide," Roman red," "Swiss red," &c. These colours have largely superseded true vermilion, as they are of a brilliant red, and on the whole, withstand exposure fairly well, though as above mentioned there are noteworthy exceptions. On being affected, they change to a lighter colour instead of a darker, as is the case with genuine vermilion, and they are much lower in price.

Quicksilver vermilion is considered to be superior in body, permanency and richness. The scarlet chromates of lead whilst possessing enduring qualities, lack body, and are not so rich in colour. Of the pigments known as eosine it may be said that they are intermediate in character between the other two reds mentioned. Their colour is exceedingly brilliant, and the body good; but they are often very fugitive.

Red Lead.—This, known also as minium, is an artificially-produced oxide of lead, manufactured by lead refiners and corroders. Litharge is of similar character.

Ochre.—Ochres are hydrated oxides of iron, containing varying proportions of ferric oxide and water. The term has also come to include earthy mixtures of silica and alumina, with oxide of iron, and sometimes calcareous matter and magnesia. "Indian red" is a term originally given to a mineral from the Persian Gulf, and used as a pigment. Speaking generally, ochre is found wherever iron is mined. Ochres vary in colour from light yellow to a deep orange or brown, and consist of iron peroxide and water, with varying proportions of clay in a state of impalpable subdivision. Typically, it should contain about 80 per cent. peroxide of iron, and 20 per cent. water, but it is very rarely found quite pure, and is undoubtedly a decomposition product. That kind known as high grade ochre is principally used by paint grinders.

Umber.—This is a natural mixture of limonite (hydrated ferric oxide) and hydrated manganese, with clay. Certain mineral pigments are sometimes mixed together to form an artificial umber. It is a rich brown colour.

Sienna.—This is a name given to clay coloured by the peroxides of iron and manganese. It is largely prepared in Italy.

Ultramarine.—Strictly speaking, this term should be reserved for the blue pigment obtained from "lapis lazuli." As that mineral is of very rare occurrence in Nature it need hardly be remarked that what are commonly called ultramarines are only imitations of the real thing. The finest examples of "lapis lazuli" have been obtained from Persia, Lake Baikal, Bokhara, and more recently from China. Only two or three per cent. of the purest article can be obtained from the best stone, and the pigment, therefore, is very expensive, and only used by artists. For our own part, we are under the impression that real ultramarine is hardly ever now used.

The artificial preparation is composed approximately of 46·60 per cent. silica, 23·30 alumina, 3·83 sulphuric acid, 21·48 soda, 1·06 iron oxide, and traces of lime, sulphur, and magnesia. The ingredients employed are sometimes china-clay, sodium sulphate, charcoal or pit-coal, and resin; or china-clay, soda, silica, sulphur, and resin. The raw materials are ground very fine, well-mixed, and pressed, and calcined in muffle furnaces, at a red-heat for twelve to thirty-six hours, or until the sulphur is nearly burnt off. When the firing is complete the furnaces are closed tightly, and the material is allowed to cool, requiring five to six days. The product is first green ultramarine, which, during the cooling process, changes into a dark blue. After washing, it is ground in wet mills, for from two to five days, settled under the action of heat, repeatedly washed, classified, dried, bolted, and packed.

Slate and Shale.—These are used to a limited extent in inferior paints, as pigments after grinding. They produce green, slate, red, and drab colours. The ground pigment is mixed in oil in proportions as desired. It is principally employed in the preparation of certain roofing paints.

OBITUARY.

Mr. Benjamin Bucknall.—The *Times* says that by the death of Mr. Benjamin Bucknall, architect, which occurred at Algiers on November 16, the English colony there has lost one of its best-known and most valued members. The friend and companion of Viollet-le-Duc, several of whose works he translated into English, and whose guest he was while the great French architect was rebuilding the Château of Pierrefonds for Napoleon III., Mr. Bucknall went to Algiers about twenty-two years ago. He had gone there in search of health and without any definite idea of remaining; but, charmed with the country and his surroundings, he settled there permanently. With singular knowledge and good taste he adapted Moorish art to modern requirements, and the many beautiful villas in the neighbourhood of Algiers which he built or reconstructed for French as well as for English owners are very graphic evidences of his genius and good work. So successful was he that he was employed by wealthy natives as well as by Europeans. Mr. Bucknall died after a short illness following on influenza. His funeral was so largely attended by persons of all nationalities and classes that it assumed almost a public character.

GENERAL BUILDING NEWS.

Theatre, Heaton, Northumberland.—The foundation stone of the new Grand Theatre at Heaton, was laid on the 17th inst. The building is situated at the extreme west end of Shields-road, and is designed to seat about 2,500 people. The sides abut into the public streets; three exits being provided for the pit, two for the gallery, and one large staircase for the circle. The length of the building from the curtain to the back of the pit is 67 ft., and the width of pit 58 ft. The stage, which is 58 ft. by 44 ft. 6in. has been designed to accommodate the largest productions, and has a large suite of dressing-rooms on each side. A separate staircase leads from each suite direct to the street. The stage will be cut off from the auditorium by a fire-proof curtain. The principal entrance to the building, which is at the south-east corner, is surrounded by a turret. This entrance leads into a vestibule, from which the circle and private boxes are approached. The building will be lighted by electricity, and warmed by hot water. The designs have been prepared by Mr. Wm. Hope, architect, Newcastle, and are being carried out by Mr. S. F. Davidson, builder, Heaton.

Sunday School Buildings, Golcar, Yorkshire.—The Baptists of Golcar have decided to build a new Sunday School on the central hall plan, to provide accommodation for 600 scholars. Mr. J. Berry, of Huddersfield, is the architect.

Prudential Insurance Company's Buildings.—The fireproof construction of the new buildings for this Company in Edinburgh and Dundee, of which Messrs. A. Waterhouse & Son are the architects, is to be carried out, including the whole of the constructional steel and iron work, by Messrs. Arrol's Bridge and Roof Company, Glasgow.

Tower of Llangynllo Church, Radnorshire.—Plans for the restoration of the tower of this church have been prepared by Mr. F. R. Kempson, Hereford. The tower, it is reported, is in so dilapidated a condition that it is doubtful if it will stand the frost of another winter. It has been deemed advisable to cease ringing the bells placed within the tower.

Bakery, Lancaster.—A new bakery has just been erected by the Lancaster and Skerton Co-operative Society at Skerton (now incorporated with Lancaster). The buildings are of brick from the local Claughton Company, and have been built by Mr. Rd. Cornthwaite, bricklayer and ovenbuilder; Mr. Wm. Richardson, joiner; Mr. Liver, slater; Messrs. Calvert & Heald, plumbers; and Messrs. Meadowcroft & Sons, painters—all of Lancaster. The building is of two stories, with the cooling-room and covered lurry entrance at the east end, the bakery in the centre, and the ovens and stoke-hole at the west end. The bakery and cooling-room are lined with white glazed bricks, and the ceilings finished in Robinson's cement and cream enamel painted. The upper story has a concrete and steel floor, and is used principally as a store room, the portion over the cooling-room being occupied by one of Crossley's gas-engines, which drives Messrs. W. H. Mason, Limited, mixing, &c., machines, and the hoist over the entrance. Two of Cornthwaite's double-decker ovens are in use, and space remains for a third. The architect was Mr. J. Parkinson, of Lancaster.

Board School Norwich.—The new Board School erected in Angel-road, Norwich, has just been opened. The buildings are constructed on the central-hall principle, containing a small hall for the infants and a larger one for the mixed section. The dimensions of the latter hall are 92 ft. by 43 ft. Around it are arranged a series of eleven class-rooms and the private room of the head-teacher. Upstairs is a suite of rooms, in course of completion, comprising chemical and physical laboratories, lecture-room, weighing-rooms, and preparation-room, and store-room for chemical appliances. Mr. C. J. Brown, of Norwich, was the architect, and Mr. Hawes was the contractor.

Primitive Methodist Chapel, Kirkburton, Yorkshire.—Plans are now being prepared for a Primitive Methodist Chapel at Kirkburton. Mr. J. Berry, of Huddersfield, is the architect.

Soldiers' and Sailors' Home, Norwich.—A new Soldiers' and Sailors' Home has just been built at Norwich. The premises are situate at the corner of Queen-street and Tombland, and were formerly used as a cigar and tobacco manufactory. The principal entrance to the home is in Queen-street, and on the left is a bedroom for the use of soldiers and sailors on furlough. On the right is the billiard-room, and through this the coffee-room, with the bar fronting both Tombland and Queen-street. The matron's house adjoins and faces Tombland, from which it has its entrance. On the first floor is a reading-room, and the writing-room is over the bar. On the landing is an emergency exit, with private access to Tombland. On the top floor is a lecture-hall. Opposite the lecture-hall is a similar room for committee purposes. Mr. A. J. Lacey, of Norwich, was the hon. architect, and Messrs. G. E. Hawes & Son were the contractors.

School, Whitechapel.—On the 18th inst. Sir John Lubbock, M.P., opened the new building of the Whitechapel Commercial School. Built by Messrs. Hammond and Son from designs by Mr. F. Pouler Telfer, on freehold land belonging to the parochial charities, it has cost between 7,000*l.* and 8,000*l.*

Co-operative Store, Skelmanthorpe, Yorkshire.—We are informed that a new Co-operative Store is about to be built at Skelmanthorpe, at a cost of 1,000*l.* Mr. J. Berry, of Huddersfield, is the architect.

Court House, Richmond.—The foundation stone has just been laid of the new Borough Sessions House in Paradise-road, Richmond. The building was erected from plans prepared by Mr. Ancell. The new building contains in addition to the court-room, a magistrates'-room, clerks'-room, counsel-room, waiting-room for witnesses, and several apartments for those who are brought there by the police. Provision will also be made for the

meetings of the Main Sewerage Board, and the frontage of the building is put back six feet from the old line, so that some day the street may be widened.

FOREIGN AND COLONIAL.

FRANCE.—On Saturday the Municipal Council of Paris received, at the Hôtel de Ville, the members of the London Chamber of Commerce, who had come over to study the subject of the metric system of measurement with a view to its introduction into England.——M. Froment-Meurice, the sculptor, is at work on the statue of Chopin to be erected in the Parc Monceau.——A committee has been formed to raise a monument to the memory of Alexandre Dumas, in the Place Malesherbes, which it is proposed should take the name of Place Dumas.——The Council of Paris is about to demolish the Hôpital Trousseau, which has been found defective, and replace it by three smaller hospitals for children in the XIIth, XVIIIth, and XIXth Arrondissements.——It is announced that the fine Château of Vizille, built by the Connétable des Lesdignières, and where Louis XIII. lived with his Court, is to be demolished shortly to give place to an industrial establishment. The château belongs at present to the Casimir-Perrier family.——In regard to the question of the preservation of the ancient "Cité des Baux" near Arles, it is now proposed to schedule the whole site called the "Vallon d'Enfer" under "Monuments Historiques."——M. Maurice Faure, Deputé in charge of the Budget for the Fine-Arts Department, has earnestly pressed the idea of the foundation of a School of Art at Arles.——M. Fernoux has been re-elected President of the Société Nationale des Architectes de France; M. Bouhon has been appointed Vice-President, and M. Christie general secretary.——At its last sitting, the Parliamentary Committee occupied with the 1900 Exhibition discussed the question whether it was necessary to pronounce at once, as several members wished, on the general principle of the Exhibition. The result was that the Committee has postponed the final discision till it has had time to examine the communications with foreign powers, in order to come to an understanding as to whether the invitations to such powers are to be regarded as officially sent, and if France as a nation has entered into any engagement with foreign countries in connexion with the subject. The Committee also wish to know whether the financial co-operation of the Municipal Council of Paris is conditional on the acceptance of the plan as proposed.

GERMANY.—The "Old Post Office" at Berlin is in course of demolition, for the widening of the Kœnig-strasse. The Spittelmarket is to be built over, a company having been formed to erect some public buildings on the ground.——The monument for the late Brugsch Pascha is now ready. It consists of a fine granite slab (which has been brought from Sakkara), on which a bronze semi-relief portrait of the deceased has been fixed.——An exhibition of photographs is being arranged for next year at Berlin. The Empress Frederick will be the patroness if we understand the local papers rightly.——The new block, which is to be the home of an annual fair or "Messe" at Berlin is now nearly completed, and will probably be opened in the spring. The building is situated off the Ritterstrasse, and Herr Zadek, of Charlottenburg, is the architect. The plan practically includes a number of galleries and show-rooms, with a public assembly-room, a large restaurant, and elaborate offices.——Munich is to have some elaborate improvements, including the remodelling of the quarter between the Court Gardens and the Church of St. Anna, according to the plans of Herr Otto Lasne, who was a successful candidate in the great Vienna Improvements Competition, and we understand that the Municipality of Munich has now definitely passed this scheme. The proposed works will lead to the clearing of a very insanitary area.——There has been an extensive flooding of basements and cellars at Berlin, owing to the bursting of one of the upper mains from the waterworks, and several houses have had to be cleared, owing to the danger arising from injury to the foundations. The Berlin Fire Brigade has been requested to pump out the cellars, and has put a number of their steamers at the disposal of the house owners.——The Berlin Fire Brigade is to have several new stations, and among them a new central headquarters. The Municipality proposes purchasing a site of about 16,000 square mètres, superficial, for the latter purpose, in the very heart of the city. The present headquarters of the brigade are to be materially altered, and a vote of 12,500*l.* has just been passed for this purpose by the City Council.——The old military forage stores at Berlin have been bought up by a company, who propose adopting them for the purpose of a theatre, or rather for spectacular performances, similar to those of our Olympia, or the Empire of India Exhibition. Mr. B. Kiralfy, of London, is one of the managing directors.

AUSTRIA.—The statue of Raimund which is to be erected in front of the theatre of the same name is now nearing its completion. Herr Franz Vogel is the sculptor. A bust to the late *savant*, Dr. Stefan, has been unveiled at the University, where the central hall has been specially adapted for memorials of this kind.——A monument in the memory of Scheffel has been erected on the Staffelberg.——There was a destructive fire on the 17th inst. at the large gas-works in connexion with the Great Western Railway Station.——A monument to Littrow has been unveiled at Abbazia; it is in the form of a life-size semi-relief, and the sculptor is Professor Ruduff Wier.——Further sections of the improvement scheme for Vienna have been passed by the Municipality. The sections which have lately been before them refer to the "inner circle" of the city, and the plans were prepared by the Municipal Board of Works.——The Vienna "Camera Club" has been invited by the Special Royal Archæological Commission to assist in forming a collection of photographs from historical buildings in the city. Herr von Schœller is the President of the club, and assistance is promised on an extensive scale.——The new hospital was opened on the 19th inst. at Neun-kirchen, near Vienna. There are sixty-two beds distributed among a central block, and four minor beds. The architect is Mr. Sehnal.——The Hungarian Parliament has as usual shown itself essentially patriotic in voting sums for the improvement of the waterways of the country. Fifty-four million florins are to be spent on such improvements in the course of the next five years. The Danube will require 24,000,000 florins, the Theis and Bodrog 12,000,000 florins. The money was voted unanimously.——It is of special interest to hear from Budapesth than an international conference of railway managers has decided to materially lower the passenger rates to Budapesth next year, on account of the Millennium Exhibition, which will be opened in the summer. The Austrian, Hungarian, Prussian, South German, French, Belgian, Italian and Oriental railways will be represented, but apparently, no English ones. This is much to be regretted.

RUSSIA.—The Technical College at Riga is increasing in popularity. The number of pupils this summer was 1,081, as compared with 942 of last year; but there were only twenty-six architects. The annual budget of the institution is under 20,000*l.*, and the library has nearly 13,000 books.——The new museum at St. Petersburg, which will have its home in the Michael Palace, will be called "The Russian Museum of Alexander III." The galleries of the Palace are very extensive, and the old music-room and the private theatre are to be altered to suit the new requirements. The collection will be limited to the Russian arts and crafts, and the first galleries which will be opened are the picture and sculpture halls.

MISCELLANEOUS.

LECTURES ON ALTERNATE CURRENT TRANSFORMERS.—A course of four Cantor lectures will be commenced on the 20th prox., at the Society of Arts, by Dr. J. A. Fleming, F.R.S., on "Alternate Current Transformers." The lecturer will deal with the action, construction, testing, and employment of the transformer.

PLUMBER'S WORK.—In view of the great importance in a sanitary respect of the work of plumbing we have been for a considerable time engaged in an inquiry as to the relative efficiency and cost of plumber's work. We have been much struck by the absence of any definite information as to the latter point, and have as far as possible endeavoured to supply the deficiency. Our inquiry is now practically completed, and we propose to publish in the course of a few weeks the results of our commissioners' investigations. These investigations have been undertaken independently by us, and we are solely responsible for the result. We have thought, however, that their value would be enhanced if the report were submitted to the criticism of experts. The Worshipful Company of Plumbers very courteously and readily fell in with our views, and appointed a committee to consider our report and make suggestions or criticisms thereon. The committee have devoted much time to this work, and we shall have great pleasure in printing their report as an addendum to our own. Their criticisms, whether destructive or the reverse, will be equally welcome.—*The Lancet.*

THE YEAR'S SALES AT THE LONDON MART.—The last sales of the year at the London Auction Mart, Tokenhouse-yard, have just been held, when properties of various descriptions to an amount of nearly 10,000*l.* changed hands. The total sales reported for the present year amount to 5,597,775*l.*, as compared with 4 090,196*l.*, 4,230,332*l.*, 4 597,652*l.*, 4,174,915*l.*, and 4 287,111*l.* respectively for the five preceding years.—*Property Market Review.*

PULPIT, ST. CLEER CHURCH, CORNWALL.—This ancient edifice has just acquired a carved new pulpit. It has been placed on the south side, and is approached from the chancel by a flight of four steps. The base is six-sided, moulded. The angle buttresses are carried right up into the top cornice, which is carved all around with foliage of a conventional type. The panels are deeply recessed, and have ogee heads, ornamented. The panels themselves are filled by typical foliage. A movable book-board of polished brass is provided for the preacher's convenience. This work has been carried out by Messrs. Harry Hems & Sons, of Exeter.

THE SANITARY INSTITUTE.—At an examination for Inspectors of Nuisances, held at Cambridge on the 14th inst., six candidates presented themselves, to whom certificates were granted, as follows:—W. Carver, Wretton, Norfolk; A. Garland, Greenwich; E. Hayward, Dudley; T. H. Jones, Bath; W. Kent, Watton, Norfolk; G. E. Yarnall, Loddon, Norwich.

CRYSTAL PALACE SCHOOL OF PRACTICAL ENGINEERING.—The certificates gained by the students of the Crystal Palace School of Practical Engineering during the winter session were distributed on the 20th inst. at the School by Mr. W. R. Galbraith. The examiners, Messrs. C. F. Tufnell, W. B. Clark, and H. F. Parshall, having read their reports, which were very favourable to the School, Mr. Galbraith delivered an address to the students, in which he spoke of the enormous extension of the railway system of the United Kingdom since he entered the engineering profession many years ago. He added that, unfortunately, the supply of railway engineers had more than kept pace with the demand, Those who left the Crystal Palace School must not imagine that they were entitled to regard themselves as full-fledged engineers, but should recognise that they had still a large amount of practical knowledge to master. He had had the opportunity of going through the workshops and inspecting the School, and had been greatly pleased both with the drawings and with the mechanical work of the students. He could not help feeling that it would have been of great advantage to him if in his young days it had been possible for him to obtain such a training as was given in the School. It was obvious that the heads of the different departments had bestowed great care upon the instruction of the students.—The certificates having been distributed, Mr. G. T. Rait, on behalf of the Directors of the Crystal Palace Company, thanked the examiners for their services, and Messrs. Clark and Tufnell responded, the former remarking upon the great improvement which had taken place in the School since he was a pupil there in 1880.—The proceedings closed with a vote of thanks to Mr. Galbraith for presiding and distributing the certificates.

CHURCHYARDS AND SANITATION.—An Order in Council has been made for requiring the churchwardens, or others the custodians of the parish churchyard of St. Martin Orgar, to construct a dry area, 14 ft. deep and about 4 ft. wide, between the churchyard and the back walls of five houses, Nos. 5-9, in Crooked-lane, King William-street, and for the reinterment in the City of London Cemetery, at Little Ilford, of all the human remains disturbed during the progress of the work. The Order is made under the provisions of "An Act to amend the Burial Acts" of 20-1 Vict., and follows after certain representations to the churchwardens by the Home Office to the effect that the measures in question must be carried out in order to prevent the burial-ground from being dangerous to public health. The supervision of the works is committed by the Order to Dr. Sedgwick Saunders, Medical Officer for the City, and they must be executed to his satisfaction. Another Order in Council has been made, under the Amending Burial Act of 16-7 Vict., for the discontinuance of interments in the parish churches of Great Clacton and Leyton, Essex; Downe, Kent; Horningsey and Great Wilbraham, Cambridgeshire; Bayston Hill, Shrewsbury; Dolwyddelen, Carnarvon; Bellingham, Northumberland; and Compton, Surrey; in chapels at Sherborne and Evesham, and in Handforth Church, Cheadle. The Order extends to the churchyards and chapel-yards severally belonging to these, with, however, certain enabling provisoes in respect of vaults and walled graves in the burial-grounds.

"YULE TIDE."—The periodical under this name gives with its Christmas number a large chromo-lithograph reproduction of Mr. Yeames's clever and spirited picture "Prisoners of War," representing two English middies, one of them a mere child, mounted guard over by one of Napoleon's soldiers, amid the evidently sympathetic interest of the fishing population. The original painting was, if we remember right, in the Royal Academy some years ago.

NEWCASTLE SOCIETY OF ANTIQUARIES.—A meeting of this Society was held in the Castle, Newcastle, on the 18th inst. Mr. John Philipson, J.P., presided. Mr. Maberley Philips read two letters of the seventeenth century relating to Newcastle. Mr. H. A. Adamson read a continuation of his paper on "Tynemouth Castle after the Dissolution of the Monastery." A description was given by the writer of the Castle, the prior's house, the extensive stables, and other buildings that at one time existed in the Castle grounds. Mr. Adamson produced several plans and pictures of the building as it had been, and said that Tynemouth Castle had suffered like many other buildings that had got into the hands of the Government, the most interesting features generally being destroyed and the most ugly buildings taking their place. The whole of the Spanish battery had disappeared, and it was now intended to pull down the Governor's house and make a playground for the soldiers, 4,000*l.* having been granted for the purpose. A vote of thanks was passed to Mr. Adamson. Mr. S. S. Carr read "Notes on the Recent Discovery of a Saxon Stone at Tynemouth," and received a vote of thanks for his contribution.

THE BUILDING AND REPAIRING OF CHURCHES.—The Incorporated Society for Promoting the Enlargement, Building, and Repairing of Churches

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENT.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
Club Premises, near Wigan	Hindley Conservative Club Buildings Co...	10*l.* 5*l.*	Jan. 24
Public Hall, Edzell, N.B.	Inglis Memorial	.....	Feb. 15

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Club Premises, Burnley Wood, Lancs.	Liberal Club	S. Keighley	Jan. 1
Waterworks, &c.	Killarney (Ireland) Union	*Official* do.	do. do.
Additions to Workhouse	Lutterworth Union	R. Godfrey	Jan. 4
Widening Bournville-lane	King's Norton R.D.C.		
*Laying Drains, &c.	Sheffield United Gas Light Co.	Fletcher W. Stevenson	do.
Laying Gas Main	do.	do.	do.
*Iron Standards, Fencing, &c.	Borough of Colchester	H. Goodyear	Jan. 6
Laying Pipe Track (two miles), Shielhill	Lanark C.C.	Leslie & Reid	do.
Bridges	Hanley (Staffs) Corp.	J. Lobley	do.
*Alterations to Middle-street School	Brighton and Preston Sch. Bd.	P. Simpson & Son	do.
School Alterations, Ferndale	Ystradyfodwg Sch. Bd.	J. Rees	Jan. 7

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Sewers, &c. Crofton	Bromley (Kent) R.D.C.	A. Williams & Son	Jan. 8
Drainage Works	Dublin Corp.	G. Chatterton	do.
Water-gas Installation	Manchester Corp.	*Official*	do.
*Road Materials	Com. of H.M. Works	do.	do.
Filter Beds, &c.	Motherwell (N.B.) Commrs.	Jas. McCallum	Jan. 9
Road Materials, Bognor	West Sussex C.C.	C. Adcock	Jan. 10
*Works and Materials	Hanover Square Vestry	G. Livingstone	Jan. 11
*Stoneware Pipe Sewers and Laying-out Sewage Farm	Langport R.D.C.	J. T. Hawkins	Jan. 18
Additions to Asylum, Bodmin	County Asylum Visitors	W. J. Jenkins	Jan. 24
*Supply of Guernsey Granite, &c.	Stoke Newington Ves.	S. E. Burgess	Jan. 25
Drainage	Uphall (N.B.) Parish Council	*Official*	No date
New Road	Herts County Council	do.	do.

PUBLIC APPOINTMENT.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*Assistant Surveyor	County of Stafford	175*l.* per annum	Jan. 1

Those marked with an asterisk (*) are advertised in this Number. *Contracts, pp.* lv., vi., viii., *&* xviii. *Public Appointments, p.* xviii.

and Chapels held its usual monthly meeting at the society's house, 7, Dean's-yard, Westminster Abbey, on the 19th inst. Grants were made in aid of the following objects:—Building the new Church of St. Augustine, Preston, Brighton, 100*l.*; and towards enlarging or otherwise improving the accommodation in the churches at Kirkbride St. Bride, near Silloth, Cumberland, 25*l*; and Thornton St. Peter, near Leicester, 20*l.* The following grants were also paid for works completed:—Ash-next-Sandwich St. Nicholas, Kent, 40*l.*; Willingham St. Mary and all Saints, Cambs., 70*l.*; South Bank St. John, near Middlesbrough, 200*l.*; Ripley St. John, near Derby, 90*l.*; and Rubery St. Chad, near Bromsgrove, 25*l.* In addition to this the sum of 246*l.* was paid towards the repairs of thirteen churches. The society likewise accepted the trust of sums of money as repair funds for Christ Church, Helme, near Huddersfield, and St. Mary's, Hornsey, Middlesex.

TECHNICAL EDUCATION FOR PLASTERERS.—A public meeting was held on the 19th inst. at the Club Union Buildings, Clerkenwell-road, for the purpose of taking into consideration the practical application of technical education to the plasterers' craft. Mr. D. Hennessey, Organising Secretary of the London District of Operative Plasterers, presided. Mr. Sidney Webb said that the Technical Education Board and the County Council took a very great interest in the classes, which had been started for the purpose of turning the mere "handyman" into the skilled mechanic. For plasterers three classes in fairly central situations had already been started, and competent men engaged to give instruction. He could not, however, say that these classes were quite so well attended as could have been wished. The plasterer was not so badly off as some of his fellow-workmen; his hours, especially in winter, were not so long, and he thought that it was quite possible for those who took any interest in the matter to give up their own amusement one evening in the week. He wished all mechanics to avail themselves of their opportunities in the way of becoming more skilled in their work, and not to be content to keep in the lower ranks, which were always overcrowded, and where the workman was in constant danger of being thrown out of work. Mr. W. R. Lethaby (Art Inspector to the Technical Education Board), Professor Banister Fletcher, Mr. E. Quirk (Instructor at the Battersea Polytechnic), and others also spoke.

NEW INSURANCE BUILDINGS, HANOVER.—The German Military Insurance Association, which has its headquarters at Hanover, has lately erected some very handsome offices in this town, Herr W. Hauers, of Hamburg, acting as architect. The office has given out over 250,000 policies, and required accommodation for a large staff of officials, with a provision for extensions. The principal block, which has lately been completed, cost over 31,000*l.* The plans are certainly very practical, and are well adapted for the proposed extensions, whilst the German Neo-Gothic style, which has been adopted, is far more successful than is usually the case in North Germany. Freestone has been used for the façades, and oak for most of the joinery. The interior decoration is very pleasing, especially in the board-room, where there are two well-executed frescoes by Professor Dopmeyer, representing "Peace" and "War."

FOOT BRIDGE, PARLIAMENT HILL FIELDS, HIGHGATE.—On the 21st inst. the foot-bridge erected by the County Council to connect Gospel Oak and that district with Parliament Hill Fields, Highgate, was opened by Mr. W. J. Wetenhall, L.C.C. The bridge is situated over the L. and N.-W. Railway, midway between Gospel Oak and Hampstead Heath Stations. The Hampstead Junction Railway divides the district from the recreation grounds, and for a mile no means were provided for the public to cross the line. The foot-bridge crosses the railway at a point where a former footpath passed through the fields. The bridge is of steel, with piers of blue Staffordshire brick, and is 20 ft. wide. It has cost 2,400*l.* The land for the approach on the Gospel Oak side near Roderick-road was purchased and the road made by the St. Pancras Vestry, at a cost of about 1,300*l.* The Brunswick Rock Asphalt Paving Co., of Grace-church-street, have laid the whole of the asphalt paving. The contractor for the structure was Mr. George Palmer, of Neath, Glamorganshire.

PROPOSED EXHIBITION AT DRESDEN, 1897.—The Department of Science and Art has received, through the Foreign Office, a despatch from the German Ambassador at this court, calling attention to an International Art Exhibition proposed to be held at Dresden in May to October, 1897, to consist of collections of works from different countries, and to comprise works of painting, sculpture, and architecture, and of the delineating and multiplying arts, which have been produced during the last ten years.

GETTING RID OF PEAT-WATER IN LEAD PIPES.—In a paper recently read before the "Yorkshire Association of Students," at Leeds, Mr. Oscar Kirby, the Butley Waterworks engineer, dealt with the subject of the means of preventing lead contamination in house-water supply. It appears that in his district, where the water acts strongly on lead, the inhabitants had been told that it was wise to let the water run a little before using it for drinking and cooking, to get rid of the water which had been standing in the lead pipes, and this advice had been so thoroughly acted upon as to lead to a waste of 114 per cent. of water! Having come to the conclusion that it was the peat which supplied the elements that acted on lead, and that this was chiefly brought down in time of storm, Mr. Kirby has devised a flood-gate so poised that it admitted water under ordinary flow but closed the passage in time of flood, directing the water to another channel. To ensure the gate opening as soon as the storm-water had subsided, the storm-water weir is crenellated, and when the water subsides so as to pass through the "crennel" only, the gate, which had been kept closed by the pressure of the flood-water on its upper elbow, opened. Leaping weirs, tried for the same purpose of separating storm-water, had, he said, failed in their effect, and he proposed this form of hinged flood-gate as a more efficient method.

TRADEMARKS.—Messrs. W. P. Thompson & Co., of the British and Foreign Patent Office, Liverpool, write:—"An important decision has just been made by the Patent Office as regards signatures as trademarks. Section 64 Sub-section A of the Patent Act of 1888, states 'that a trademark can consist of a name of an individual or firm, printed, impressed, or woven in some particular or distinctive manner.' The Patent Office, with the approval of the Attorney-General, has now decided that such a signature as 'The London Stout Company,' or the 'Eagle Brand Company,' or, we presume, the 'Midland Railway Company,' even though it be the real trading name of the company, cannot be registered as a trademark, and that no signatures will be allowed unless they consist of a personal name or personal names, with or without, we presume, the addition of '& Co.,' '& Son,' or the like. Furthermore, the office have already decided that no trademark having no other distinctive part than a personal name, and which is found in a Directory as a surname, can be registered, and Judge North has gone so far as to extend this decision to any personal name found in any novel or other book, and in particular has refused to recognise as a trademark the name 'Trilby,' on the ground that it is a personal name in a novel, though there is no proof that it has ever been an actual surname."

GLASGOW BUILDING TRADES EXCHANGE.—The second of the series of monthly meetings of the Building Trades Exchange was held in the Exchange on the 19th inst., when Mr. Robert Scott, measurer, Glasgow, read a paper entitled "Some Conditions of Contracts." Mr. Scott said that the conditions he proposed to deal with were those relating to the extent and character of the work in the contract, the variations, the extras, and the appointment of arbiter. The extent and character of the work was usually determined by the plans and estimate, and it was necessary that plans should be carefully prepared, so as to give a true indication of the nature and extent of the work to be contracted for. The detail drawings furnished during the progress of the work should only be developments of the original plans. The estimate should contain an accurate representation of the nature, quality, and measurement of the material and labour, each part being measured on a well-defined principle. In some cases such complete plans were not forthcoming, consequently, proper estimates were not supplied, and when the work came to be executed, details were found to have little or no relation to the original drawings, and disputes arose as to the prices for altered work. Mr. Scott proceeded to deal with the clause empowering architects to make alterations. He quoted the usual clause, commented on its elasticity, and advocated that the powers it contained should be as little taken advantage of as possible, so that contractors might only be called upon to execute the work truly contracted for. In dealing with extras Mr. Scott pointed out that many items arose where contract rates did not apply, and that those should be priced at fair and reasonable rates. With regard to the question of appointing an arbiter, he said that in ordinary contracts it seemed to be the custom for the architect to appoint himself to the post. He pointed out that as the architect was really agent for the proprietor this was naturally objected to by the contractor. He stated that the general opinion was that in all cases the arbiter should be some proper qualified person mutually chosen; and in the event of parties failing to agree on an arbiter, the arbiter should be appointed by the Sheriff of the county. Mr. Gray proposed a vote of thanks to Mr. Scott, which was cordially agreed to.

MEETINGS.

WEDNESDAY, JANUARY 1.

Builders' Foremen and Clerks' of Works Institution.—Ordinary Meeting of the Members. 8 p.m.

SATURDAY, JANUARY 4.

Sanitary Inspectors' Association. — The President, Sir B. W. Richardson, will deliver his New Year's address.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

21,780.—DRAIN TEST: *A. Harkess.*—Consists of a hollow cylinder or movable float encircling a vertical tube enclosed within an outer casing containing water. The pressure is produced by means of the cylinder being immersed in water to a depth regulated to suit the test required.

23,213.—VENTILATORS: *F. Smith and others.*—Glazed earthenware ventilators for stables, &c., made with openings or funnels in the sides arranged to cause an up-draught in connexion with a louvre cap.

722.—DRAINAGE: *R. Matthews and others.*—A system of drainage in which the surplus water or sewage is first collected in settling pits, the clear effluent being then delivered to a well or boring, and discharged at an underground spring level. Means are provided for filtering the effluent from the settling pit before it is delivered to the well or boring.

1,029.—WINDOWS: *S. Baines.*—Sliding windows which are held in position, when raised, by spring friction. The sashes are constructed with a projecting strip of metal at each side which slides in a tubular or other spring clip secured within the casement; the grip of such spring being sufficient to overcome the weight of the window.

1,092.—FLOORS: *C. Major.*—Fireproof and ventilated floors are constructed of hollow clay or concrete blocks, which extend from one supporting girder to another, having undercut projections or recesses to permit of their being placed in position on their supporting girders from beneath, and to prevent them from moving in a longitudinal direction.

14,735.—VENTILATOR: *R. Horsfall.*—Refers to a previous specification, No. 4,651-95, and deals with certain additions in ventilators which may also be used for chimney-tops. An internal flue is surrounded by air chambers or passages, and the whole is encased in an outer cover, having air-inlets at the base, and surmounted by a baffle and cap.

19,126.—BRICKS: *C. Guckuck.*—Pertains to bricks for masonry which are constructed with vault-like cavities in the bottom surfaces, adapted to retain a quantity of air without decreasing the strength of such bricks.

NEW APPLICATIONS FOR LETTERS PATENT.

DECEMBER 9.—23,534, E. Flint, Plane-irons.—23,542, W. Youlten, Fan-light Stays.—23,545, W. Mansfield, Window-guard and Ventilator.—23,549, The Earl of Erroll, Surveying Apparatus.

DECEMBER 10.—23,604, J. Linkleter, Ladders.—23,636, J. Hamblet, Paving-bricks and Dies for the Manufacture of same.—23,642, J. Berry and G. Beardsall, Brick-press.—23,648, H. Scattergood, Water-closet Seats.—23,649, E. Fales, Grates.—23,651, V. and G. Ietley, Roofing-tiles, also applicable for Walls, &c.—23,686, P. Marcus, Step-ladders.—23,705, T. Smart and C. Bennett, Kiln for Burning Bricks, &c.

DECEMBER 11.—23,726, T. Gill, Combined Screw and Nail.—23,773, M. Dessan, Paving-blocks and Slabs.

DECEMBER 12.—23,782, M. Adams, Hinged Seats and Flush-pipe Connexions for Closets.—23,790. E. Clifford and others, Self-acting Sash-fastener.—23,826, R. Hughes, Bricks, Tiles, &c.—23,847, D. Isles, Open Stoves and Close Ranges.—23,848, D. Waller, jun., Sash-fasteners.—23,866, E. Smedley, Kitchen Ranges, &c.

DECEMBER 13.—23,891, Carron Co. and W. Miller, Kitchen Ranges.—23,904, C. Rowe, Machinery for the manufacture of Lead-pipes.—23,916, J. Deane and W. Herbert, Composition for the manufacture of Building and other materials.—23,921, J. Jeffreys, Ventilating Fans.—23,923, S. Shewell and W. Cox, Construction of Iron and Steel Bridges and Girders.—23,924, J. Davies and R. Lloyd, Syphon Flushing Cisterns.—23,954, W. Byers, Device for preventing Ladders slipping when in use.

DECEMBER 14.—23,967, C. Thornett, Cistern Valves.—23,969, C. Ismay, White Lead.—23,970, J. Adams, Double Spring action Butt Hinge.—93,972, A. Thompson, Guides for Band Saws and other Circular Saws.—23,980, P. Jantzen, Artificial Stove Blocks or Plates.—23,983, A. Doman, Door, Gate, and Flap Hinges.—23,990, R. Wagner, Opening, Closing, and securing in position, Wings of Windows.—24,014, J. Forster, Tipping Closets.—24,025, R. Marshall, Water-waste preventing Tanks, Cisterns, &c.—24,043, W. Bird, Windows with Sliding Sashes.

PROVISIONAL SPECIFICATIONS ACCEPTED.

13,924, R. Stone, Fireproof, Waterproof, and Non-Corrosive Paint.—15,463, J. Chalmers, Door Fasteners.—15,712, W. Cawthorne, Locks, Latches, &c.—18,969, H. Roberts, Flushing Cisterns.—19,884, H. Harrington, Window Locks.—20,623, D. Arthur and others, Ventilation of Drains and Sewers.—20,726, J. Schofield, Waterproof Roofing Paper for Houses, Sheds, &c.—20,999, H. Hunt, Wood Screws.—21,671, J. Wallace, Drums for Holding Mixtures used as Paints.—21,713, J. Nuttall, Windows.—22,518, A. Johnson, Concrete Floors.—23,110, T. Hill, Wall Tiles.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

23,814, W. Mockett, Ventilation of Main and other Sewers.—2,809, S. Williams and J. Owen & Sons, Bending Wood.—3,230, J. Duke, Syphons, &c.—17,054, G. Bellamy and others, Bricks, or Blocks for Building and Paving.—19,755, W. Willis, Flushing Cisterns.—21,281, R. Smith, Upholstered Furniture.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

DECEMBER 13.—By *Egerton, Beach & Galsworthy* (at Twickenham): 1 to 6, Purser's Cottages, Twickenham, f., r. 78*l.*, 642*l.*; 1 to 9, Alexander Cottages, f., r. 128*l.* 14s., 1,044*l.*; f.g.r. 10*l.*, Alexander Cottages, reversion in 67 yrs., 205*l.*; "Mereway Cottage" and plot of land, Mereway-rd., f., 281*l.*; f.g.r. 4*l.*, Mereway-rd., reversion in 67 yrs., 91*l.*; f.g.r. 2*l.*, Chestnut-rd., reversion in 60 yrs., 46*l.*; f.g.r., 2*l.* Chestnut-rd., reversion in 34 yrs., 42*l.*; f.g.r. 4*l.*, Chestnut-rd., reversion in 61 yrs. 91*l.*; 7, 9, 16 & 17, Chestnut-rd., f., r. 57*l.* 4s., 606*l.*; 27 to 36, Chestnut-rd., f., r. 130*l.*, 1,146*l.*—By *Restall & Ford* (at Stroud): "Dirleton House" and plot of land, Stroud, Gloucester, f., 2,300*l.*; moiety of the Washbrook Mill and Farm and Coombe House Estate, Painswick, Gloucester, 35 a. 0 r. 24 p., f., 550*l.*—By *E. & H Lumley* (at Paignton): Paignton Pier and Pavilion, Paignton, Devon, f., 2,450*l.*

DECEMBER 14.—By *Garrod, Turner, & Son* (at Colchester): "The Dairy Farm," Great Holland, Essex, 76 a. 3 r. 27 p., f., 700*l.*; six enclosures of land, 58 a. 2 r. 7 p., f., 510*l.*—By *Thompson, Rippon, & Co.* (at Crewkerne): Four enclosures of land, Merriott, Somerset, 36 a. 0 r. 10 p., f., 2,000*l.*; an enclosure of land, Crewkerne, Somerset, 9 a. 3 r. 0 p., f., 460*l.*

DECEMBER 16.—By *Hancock, Henley, & Slade:* 7 and 10, Derby Villas, New Malden, Surrey, u.t. 69 yrs., g.r. 12*l.*, r. 60*l.*, 560*l.*—By *Thomas, Peyer, & Miles:* "The Crown Brewery" and "The Saracen's Head" public-house, Davies-st., &c., Hertford, f., 1,800*l.*; "The Angel" public-house, Railway-st., c., r. 30*l.*, 810*l.*; "The Farmer's Boy" public-house and a cottage, Brickendon Green, Herts., f., r. 15*l.* 17s., 1,350*l.*

DECEMBER 17.—By *F. Dodd & Co:* 13, Saratoga-rd., Clapton, u.t. 87 yrs., g.r. 7*l.*, r. 30*l.*, 250*l.*; 66, 68, and 70, Oldfield-rd., Stoke Newington, u.t. 68¾ yrs., g.r. 15*l.* r. 80*l.*, 665*l.*; "Hexham House," Northumberland Pk., Tottenham, f., r. 22*l.*, 355*l.*; 3 plots of bldg. land, Colfe-rd., Forest Hill, f., 132*l.*—By *Rutley Son, & Vine:* 49 and 51, Grafton-st., Tottenham Court-rd., f., e.r. 50*l.*, 2,230*l.*; 13, Ampthill-sq., Hampstead-rd., u.t. 47½ yrs., g.r. 12*l.*, e.r. 80*l.*, 500*l.*; 2 plots of bldg. land, Bowes-rd., New Southgate, f., 100*l.*—By *Egerton, Breach, & Galsworthy:* 124 and 126, Dawes-rd., Fulham, u.t. 83¾ yrs., g.r. 12*l.*, r. 64*l.*, 530*l.*; 92, Bishop's-rd., u.t. 81¼ yrs., g.r. 6*l.*, 250*l.*—By *Bean, Burnett, & Eldridge:* 19, 23, 85, and 95, South Hill Pk., Hampstead, f., r. 262*l.* 10s., 2,955*l.*; 17, South Hill Pk. Gardens, f., r. 65*l.*, 800*l.*; 36 and 56, Parliament Hill rd., f., r. 175*l.*, 1,620*l.*; 5, Nassington-rd., u.t. 81½ yrs., g.r. 6*l.*, r. 60*l.*, 600*l.*—By *J. A. Lumley & Co.* (on the premises): 82, West Cromwell-rd., Kensington, u.t. 72 yrs., g.r. 12*l.*, 780*l.*

DECEMBER 18.—*G. Head & Co.:* 11, Blandford-st., Portman-sq., u.t. 10½ yrs., g.r. 65*l.*, r. 160*l.*, 165*l.*—By *Ventom, Bull, & Cooper:* 67, Gunterstone-rd., Kensington, u.t. 81 yrs., g.r. 15*l.*, r. 70*l.*, 500*l.*—By *H. Bond & Son:* 127, Winstone-rd., Stoke Newington, u.t. 64½ yrs., g.r. 5*l.*, r. 30*l.*, 305*l.*; 19, Dynevor-rd., u.t. 79 yrs., g.r. 6*l.*, r. 30*l.*, 300*l.*; 45, Victoria-rd., u.t. 66½ yrs., g.r. 6*l.*, r. 52*l.*, 600*l.*—By *Morgan & Baines* (at Sutton): "Stone Cot Hall" and 4½ a., Sutton, Surrey, f., 1,600*l.*; a house and shop and cottage adjoining, West-st., Carshalton, Surrey, f., r. 50*l.*, 1,075*l.*—By *Rendall & Symons* (at Newton Abbot): "Great Sloncombe" Estate, Moretonhampstead, Devon, 156 a. 3 r. 35 p., 3,210*l.*

PRICES CURRENT OF MATERIALS.

TIMBER.		
Greenheart, B.G.	ton	8/0/0 0/0/0
Teak, E.I.	load	10/0/0 16/0/0
Sequoia, U.S. ft. cu		1/10 2/0
Ash, Canada load		3/5/0 4/10/0
Birch, do.		2/15/0 4/15/0
Elm, do.		4/0/0 5/5/0
Fir, Dantsic, &c.		2/0/0 3/10/0
Oak, do.		2/15/0 4/15/0
Canada		6/10/0 8/0/0
Pine, Canada red		0/0/0 0/0/0
Do. Yellow		2/15/0 5/0/0
Lath, Dantsic, fath		4/10/0 5/10/0
St. Petersburg		5/0/0 6/10/0
Wainscot, Riga, &c., log		2/15/0 5/0/0
Odessa, crown		2/15/0 5/0/0
Deals, Finland 2nd & 1st std	100	7/0/0 8/10/0
Do. 4th & 3rd		7/0/0 8/0/0
Do. Riga		7/0/0 8/0/0
St. Petersburg, 1st yellow		9/10/0 12/0/0
Do. 2nd yellow		7/10/0 9/0/0
Do. white		8/0/0 9/10/0
Swedish		7/0/0 15/10/0
White Sea		7/15/0 14/15/0
Canada, Pine 1st		21/0/0 25/0/0
Do. do. 2nd		16/0/0 17/0/0
Do. do. 3rd, &c.		8/0/0 10/0/0
Do. Spruce, 1st		9/0/0 20/10/0
Do. do. 3rd and 2nd		6/15/0 7/10/0
New Brunswick		6/0/0 7/0/0
Battens, all kinds		5/0/0 20/0/0
Flooring boards, sq., 1 in. prep.		
1st		0/9/6 0/14/6
Do. 2nd		0/6/6 0/11/6
Other qualities—		0/4/6 0/7/6
Cedar, Cuba	ft.	/4 /4½
Honduras, &c.		/3½ /4½
Mahogany, Cuba		/3½ /6
St. Domingo, cargo av.		/3½ 1/0
Mexican do. do.		/4 /4½
Tobasco do. do.		/4½ /6
Honduras do. do.		/4½ /6
Box, Turkey	ton	4/0/0 15/0/0
Rose, Rio		7/0/0 16/0/0
Bahia		6/0/0 15/0/0
Satin, St. Domingo		0/0/5 0/1/0

TIMBER *continued*.		
Satin, Porto Rico		0/1/6 0/1/6
Walnut, Italian		0/0/3 0/0/7
METALS.		
Iron—Pig, in Scotland	ton	2/6/4½ 0/0/0
Bar, Welsh, in London		5/12/6 5/15/0
Do. do. at works in Wales		5/2/6 5/5/0
Do. Staffordshire, in London		6/0/0 6/10/0
COPPER—British cake and ingot		46/0/0 46/5/0
Best selected		46/10/0 46/15/0
Sheets, strong		53/0/0 0/0/0
Chili bars		43/3/9 43/8/9
YELLOW METAL		0/0/4 9-16 0/0/4⅝
LEAD—Pig		
Spanish	ton	11/6/3 11/7/6
English com. brands		11/12/6 11/15/0
Sheet, English, 6 lbs. per sq. ft. and upwards		12/10/0 12/12/6
Pipe		12/10/0 0/0/0
ZINC—English sheet	ton	18/5/0 18/10/0
Vieille Montagne		18/15/0 0/0/0
TIN—Straits		61/15/0 62/5/0
Australian		62/10/0 63/0/0
English Ingots		65/0/0 65/5/0
Banca		64/0/0 64/10/0
Billiton		63/10/0 64/0/0
OILS.		
Linseed	ton	19/5/0 19/15/0
Cocoanut, Cochin		25/10/0 0/0/0
Do. Ceylon		22/10/0 23/15/0
Palm, Lagos		22/10/0 0/0/0
Rapeseed, English pale		24/5/0 25/0/0
Do. brown		23/5/0 23/15/0
Cottonseed ref.		16/17/6 17/7/6
Oleine		19/10/0 20/10/0
Lubricating, U.S.		6/6/0 8/9/0
Do. black		4/3/0 6/6/3
TAR—Stockholm	barrel	0/19/6 0/0/0
Archangel		0/15/0 0/0/0

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* N.B.—We cannot publish Tenders unless authenticated by the name and address of the sender; and we cannot publish lists in which the accepted Tender is below £100.]

ACCRINGTON.—For paving, levelling, &c., Countess- and Princess-streets, for the Corporation. Mr. W. J. Newton, C.E., Borough Engineer, Town Hall, Accrington:—
W. H. Bury, Union-road, Oswaldtwistle, at per schedule of prices.

ALFRETON.—For the execution of street works near Park-street and Independent Hill, for the Alfreton Freehold Land Society, Limited. Mr. J. T. Shardlow, architect and surveyor, Worksop:—

Littlewood & Son	£797 11 0	J. Hawley & Son	£549 6 10
J. H. Vickers, Ltd.	594 0 0	F. L. Holmes	520 0 0
T. Smart	575 18 0	Wain & Coupe, Ripley, Derby	490 7 0
C. Dunn	575 10 0		

AYLESBURY.—For the erection of offices at rear of County Hall, for the Bucks County Council. Mr. R. J. Thomas, County Surveyor, Exchange Buildings, Aylesbury:—

S. Grist, Ltd.	£878 0 0	W. Y. Green & Co.	£677 10 0
J. Wallis & Sons	853 0 3	H. T. Grimsdale	615 0 0
Senior & Clarke	740 0 0	W. H. Siarey, Aylesbury (accepted)	588 0 0
Webster & Cannon	698 0 0		

BARNSLEY.—For paving, draining, &c., Britannia-street, for the Town Council. Mr. J. H. Taylor, Borough Surveyor, St. Mary's-place, Barnsley:—

Schofield	£143 12 0	John Hood*	£120 0 0
Hy. Burrows	126 16 6		

* Accepted.
[All of Barnsley.]

BRISTOL.—For the formation of road and sewers, Barton Hill, for Mr. D. Johnstone. Mr. W. Cloutman, surveyor, Somerset Chambers, Corn-street, Bristol. Quantities by the surveyor:—

Wilkins	£419 0 0	Martin	£285 0 9
Durnford	385 0 0	Beaven	285 0 0
Mangotsfield Stone Co.	360 0 0	Thatcher	279 9 0
Bryant & Price	326 0 0	Lovell	249 13 5
Slade	309 10 0	Thomas & Webb	232 0 0
Krauss	309 0 0	Jones, St. George, Bristol (accepted)	228 0 0

[Surveyor's estimate, £250.]

BURNHAM-ON-CROUCH (Essex).—For alterations to sewage-tanks, for the Maldon Rural District Council. Mr. H. G. Keywood, C.E., Market Hill, Maldon. Quantities by Engineer:—

		Cubic yd. excavation.	Pipes cleaned and relaid in cement per yd run.	New pipes.
Thos. Adams	£267 5 7	5 0	2 6	4 0
J. T. Stammers	193 5 0	—	—	—
D. H. Porter	175 0 0	1 6	1 0	3 3
A. M. Cook, Burnham-on-Crouch, Essex*	175 0 0	1 0	0	2 8

* Accepted.

BURNLEY.—Accepted for the erection of a barley-drying kiln, Bridge End Brewery. Mr. Thos. Winn, architect, 90, Albion-street, Leeds. Quantities by the architect:—

Joinery.—Wiseman & Watson, Westgate Sawmill, Burnley	£85 19 0
Bricklaying, Masonry, and Excavating.—Heap & Harrison, Clifton-street, Burnley	375 0 0
Plumbing and Glazing.—Watterson, Hargreaves, & Crossley, Bank Parade, Burnley	17 9 8
Tiling.—Wm. Schofield, Colne-road, Burnley	56 11 0
Ironfounding.—G. Bagshaw & Sons, Ltd., Victoria Foundry, Batley	43 0 0

COLNE (Lancs.).—For the erection of a bakery, abattoirs, &c., Stanley-street, for the Colne and District Co-operative Society. Mr. J. Bower, architect, 1, Dixon's Chambers, Colne. Quantities by architect:—

J. & M. Hawley	£3,745 0 0	Lancaster Bros.	£3,166 0 0
J. R. Atkinson	3,303 11 6	Miles Higgin, Colne*	3,120 0
Dent & Sons	3,295 0 0		

* Accepted.

DONCASTER.—For the rebuilding of "Ye Olde King's Head," East Laithe Gate, Doncaster, for Messrs. Hewitt Bros., Ltd. Messrs. Athron & Beck, architects. Quantities by the architects:—

D. Gill & Son	£2,500 0 0	B. Wortley	£2,324 16 0
Mullins & Richardson	2,402 6 2	W. Aneley	2,323 0 0
Thompson & Son	2,397 0 0	Arnold & Son	2,236 0 0
		J. Athron, jun.*	2,134 0 0

* Accepted.
[Architect's estimate, £2,050].

DOVER.—For rebuilding the "Trinity Pilot" inn, for Messrs. Mackeson & Co. Messrs. Worsfold & Hayward, architects and surveyors, Dover and London. Quantities by Messrs. Dank & Bousfield, Billiter-square Buildings, E.C.:—

Hayward & Paramor	£1,867	H. Stiff*	£1,730
Austen & Lewis	1,745		

* Accepted subject to amendments.

DURHAM.—For the execution of sewerage works, Cassop Colliery Village, for the Rural District Council. Mr. Geo. Gregson, Surveyor, 43, Western Hill, Durham. Quantities by the Surveyor:—

J. G. Bradley	£456	G. T. Manners	£419
John Manners	440	John Heslop, Pittington*	419

* Accepted.

ECCLESHILL (Yorks.).—For the erection of a villa residence, Hall-road, for Miss Newstead, Bank House, Eccleshill. Messrs. J. Kendall & J. H. Bakes, architects, Calverley Chambers, Victoria-square, Leeds. Quantities by the architects:—

Masonry and Joinery.—Coates Murgatroyd, Idle	£662 0 0	£843
Plumbing.—J. E. Hartland, Bradford	80 10 0	
Painting.—Wilfred Davison, Calverley	14 10 0	
Plastering.—Fred Hollings, Idle	45 0 0	
Slating.—T. & A. Thornton, Eccleshill	41 5 6	

FENTON.—For the erection of Fenton C.E. Schools, for the Rev. and Hon. Leonard Tyrwhitt, on behalf of the managers. Plans and quantities by Messrs. R. Scrivener & Sons, Hanley:—

Brayford	£1,563 0 0	Tompkinson & Betteley	£1,367 0 0
Cornes	1,535 0 0	Bagnall	1,297 0 0
Godwin	1,517 0 0	Embrey, Fenton*	1,292 12 9
Bennett	1,475 0 0		

* Accepted.

FOLKSTONE.—For the erection of school buildings, Sidney-street, for the School Board. Mr. Joseph Gardner, architect, 2, Cheriton-place, Folkestone:—

Tunbridge	£10,324	Hayward & Parsons	£8,996
Croswell	9,580	Prebble	8,580
Jenner	9,523	Wallis & Sons	8,434
Mercer	9,510	W. H. Head*	8,369
Fearon	9,315		

* Accepted.
[All of Folkstone.]

HANLEY (Staffordshire).—For heating new schools, Cauldon-road, Hanley, on the high-pressure small-bore system, for the Hanley School Board. Mr. E. E. Scrivener, Architect to the Board, Hanley:—

R. P. Ridder	£350 0 0	Jackson & Son	£217 3 4
Acme Ventilating and Heating Co.	313 15 0	Bacon & Co.	195 0 0
F. W. Barker	310 0 0	E. Peake	190 0 0
Evans & Matthews	291 10 0	Shore & Son	182 10 0
John King, Ltd.	242 15 0	Bacon & Co.*	175 0 0
Rosser & Russell	240 0 0	Trusswell & Son	165 0 0
		Thos. Elliott & Sons	126 0 0

* No. 2 Estimate, with radiators, accepted.

HUDDERSFIELD.—For the erection of school-buildings, Crow-lane, to accommodate 420 scholars. In addition, there are rooms provided for wood-work and cookery, for the Golcar School Board. Mr. J. Berry, architect, 9, Queen-street, Huddersfield:—

Masonry.—W. Holroyd, Crimble Slaithwaite	£4,321
Joinery.—W. Lockwood, Town End, Golcar	
Plumbing and Glazing.—T. Allison, Ltd., Milnsbridge	
Slating.—T. Allison, Ltd., Milnsbridge	
Plastering and Painting.—D. Shaw, Golcar	
Steel Girders.—J. Taylor & Sons, Kirkgate, Huddersfield	
Concreting and Wood-block Flooring.—J. Cooke, Little Royd, Huddersfield	
Stone, Asphalt, Macadam.—J. Cooke, Little Royd, Huddersfield	

[Architect's estimate, £4,580.]

KANTURK (Ireland).—For the construction of sixty-six perches of sewer, Newton, for the Union Guardians:—

	Per perch. £ s. d.
M. Faby	1 16 0
J. Sullivan, Newtown, Charleville, co. Cork*	1 10 0
E. Lyons	1 8 0

* Accepted.

LONDON.—For providing the necessary rooms for the teaching of the upper standards at the Surrey-lane School, Battersea Bridge-road, for the School Board for London. Mr. T. J. Bailey, Architect:—

Johnson & Co.	£4,495	B. E. Nightingale	£4,056
Hart Bros.	4,346	J. & C. Bowyer	3,998
Holloway Bros.	4,268	G. E. Wallis & Sons	3,996
D. Charteris	4,264	Holliday & Greenwood	3,934
W. Downs	4,173	J. Marsland, Walworth*	3,915
Lathey Bros.	4,155		

* Recommended for acceptance by the Works Committee.

LONDON.—For carrying out alterations in connexion with the infants' department of the Stanhope-street School, Euston-road, for the School Board for London. Mr. T. J. Bailey, Architect:—

Marchant & Hirst	£1,915 0	W. T. Ballard	£1,569 11
Vernall, Danes, & Co.	1,590 0	F. G. Minter	1,562 0
W. Lawrence	1,589 0	F. T. Chinchen, Kensal Green*	1,549 0

* Recommended for acceptance by the Works Committee.

LONDON.—For rebuilding the girls' and infants' offices of the North End-road School, Fulham, for refitting the boys' offices, and for providing a new system of drainage, for the School Board for London. Mr. T. J. Bailey, Architect:—

G. Parker	£2,125	B. E. Nightingale	£1,928
W. Hammond	2,025	H. Knight & Son	1,889
Lathey Bros.	1,970	F. G. Minter, Westminster*	1,815

* Recommended for acceptance by the Works Committee.

LONDON.—For providing and fixing a complete system of low-pressure hot-water apparatus (with Trentham boiler) for warming the whole of Mawbey-road School, Old Kent-road, as enlarged, for the School Board for London. Mr. T. J. Bailey, Architect :—

Maguire & Son	£711 15	Wenham & Waters, Ltd.	£395 0
J. Wontner Smith, Gray, & Co.	504 0	J. Defries & Sons, Ltd., Houndsditch*	388 0
Hendry & Pattisson	457 0		

* Recommended for acceptance by the Works Committee.

LONDON.—For providing a small boiler and hot-water coils in order to improve the heating in all the class-rooms of the Cranbrook-road School, Bethnal Green, for the School Board for London :—

G. Davis	£480	Vaughan & Brown, Ltd.	£340
J. Wontner-Smith, Gray & Co.	398	Purcell & Nobbs, Cleveland. street, Fitzroy-square*	329
Fraser & Fraser, Ltd.	385		

* Recommended for acceptance by the Works Committee.

LONDON.—For providing two sliding glazed partitions in the infants' department of the Beethoven-street School, Queen's Park, for the School Board for London. Mr. T. J. Bailey, Architect :—

G. H. Sealy	£150 0	G. Neal	£148 0
J. Christie	2 8 17	W. Brown	140 0
G. Lyford	183 0	F. T. Chinchen, Kensal Green*	135 0
W. R. & A. Hide	180 10		
H. C. Clifton	168 0		

* Recommended for acceptance by the Works Committee.

LONDON.—For providing and fixing two sliding glazed partitions in the boys' and girls' departments of the William-street School, Hammersmith-road; and also for fitting up the chemical laboratory, for the School Board for London. Mr. T. J. Bailey, Architect :—

J. Garrett & Son	£292 0	W. Hammond	£258 0
J. Christie	287 5	F. T. Chinchen, Kensal Green*	255 0
G. H. Sealy	285 0		

* Recommended for acceptance by the Works Committee.

LONDON.—For providing a Kindergarten gallery and stepped flooring in the infants' department of the Hanover-street School, Islington; and for providing a new cloak-room, for the School Board for London. Mr. T. J. Bailey, Architect :—

Dove Bros.	£178 0	T. Cruwys	£157 0
I. Kiddle & Son	177 0	F. Britton	155 0
W. T. Ballard	174 6	W. Martin	153 4
McCormick & Sons	160 0	Stevens Bros., Yonge Park*	153 0

* Recommended for acceptance by the Works Committee.

LONDON.—For enlarging the Dulwich Hamlet School, Turney-road, Dulwich, by a net addition of 250 places, and for other work at the school, for the School Board for London. Mr. T. J. Bailey, Architect :—

W. King & Son	£6,871	J. Longley & Co.	£5,148
W. Pattinson & Sons	5,634	J. & C. Bowyer	5,129
Atherton & Dolman	5,563	Peacock Bros.	5,125
Lathey Bros.	5,465	Holliday & Greenwood	4,974
B. E. Nightingale	5,436	J. & M. Patrick, Rochester*	4,700
G. E Wallis & Sons	5,361		

* Recommended by the Works Committee for acceptance.

LONDON.—For enlarging the Cottenham-road School, Holloway, by 367 places, and for other work, for the School Board for London. Mr. T. J. Bailey, Architect :—

G. S. S. Williams & Son.	£18,235	E. Lawrance & Sons	£16,818
W. Pattinson & Sons	18,200	C. Cox	16 295
Killby & Gayford	18,147	G. E. Wallis & Sons	15,836
W. M. Dabbs	17,194	Treasure & Son, Harringay*	15,185
R. A. Yerbury & Sons	17,181		
Atherton & Dolman	17,070		

* Recommended for acceptance by the Works Committee.

LONDON.—For the erection of a school on the site in Kennington-road, to provide accommodation for 894 children, for the School Board for London. Mr. T. J. Bailey, Architect :—

R. A. Yerbury & Sons	£21,370	J. Marsland	£18.935
J. Longley & Co.	19,664	Holloway Bros.	18 838
Lathey Bros.	19 507	C. Cox	18,693
W. King & Sons	19,484	G. Munday & Son	18 571
W. Downs	19,387	W. Shumur	18,450
Killby & Gayford	19,227	E. Lawrance & Sons	18,438
Atherton & Dolman	19.124	J. & M. Patrick, Rochester*	17,071
B. E. Nightingale	18,998		

* Recommended for acceptance by the Works Committee.

MIDDLETON (Lancs.).—For sewering, paving, &c., Adelaide- and Half-streets, for the Corporation. Mr. W. Welburn, Borough Surveyor, Town Hall, Middleton, Lancs. Quantities by the Borough Surveyor :—

	Adelaide-street.	Half-street.
Fred Kershaw	£111 8 8	£55 13 9
John C. Shaw	105 2 4	58 0 0
Geo. Freeman & Sons	97 6 3	50 0 0
Thos. Kilburn	98 6 8	39 9 4
E. Partington & Son	94 15 5	36 1 6
Borough Surveyor's estimate	111 10 2	39 13 6

PENKHULL.—For the erection of new schools at Penkhull, for the School Board of Stoke-on-Trent. Plans and quantities by Messrs. R. Scrivener & Sons, Hanley :—

Jones	£6,246	T. R. Yoxall	£5,600
Ball & Robinson	6,165	T. Godwin, Hanley*	5.499
L. Price	6 050	C. Cornes	5.450
N. Bennett	5,750	J. Bagnall	5.333
H. R. Embrey	5,635		

* Accepted.

ROMSEY (Hants).—For the erection of school buildings, Ampfield, for the managers of Ampfield School. Messrs. Colson & Son, architects, Jewry-street, Winchester :—

H. Stevens & Co.	£1,302 0 0	Goulding	£1,280 10 0
A. Targett	1,387 19 0	R. Moody, jun.	1 279 17 1
Musselwhite & Son.	1,385 0 0	Draper	1,260 0 0
Jenkins & Son.	1,380 0 0	G. Wheeler & Son.	1 240 0 0
Charles Grace.	1,320 0 0	F. Bascombe	1,217 0 0
W. Green	1,298 0 0	W. G. Chinchen	1,175 0 0
H. J. Kite	1,297 0 0	C. A. Hutchings, Winchester*	1,133 0 0
G Goater	1,289 0 0		

* Accepted.

SHOTTERMILL (Surrey).—For additions and alterations to school buildings, for the Managers of the National Schools. Mr. A. W. G. Harding, architect :—

Dolling	£779 0
Harding Bros., Shottermill (accepted)	622 15

SOUTHEND-ON-SEA.—For laying a sewer (660 ft.) Leigh-road, for the Corporation. Mr. Harold Harlock, Borough Surveyor, Clarence-road, Southend :—

E. Iles	£495 0 0	D. Brewer & Co	£330 6 0
W. Swaker	440 0 0	Jones & Field. Harrow-road, Belvedere (accepted)	339 9 10½
Wm. Wadey	400 0 0		
W. H. Sprague	383 18 3		

WINDSOR.—For alterations and additions at the Windsor Union Workhouse, for the Guardians of the Poor of the Windsor Union. Messrs Edgirton & Summerbell, architects, of Windsor. Quantities supplied :—

Akery	£2,750	Norris	£2,195
Rowland	2,475	John Deverill	2,175
Gibson	2,377	Gray	2,154
Belch	2,290	Watson	2,148
Pither	2,280	McKie	2 130
Bampyide	2,260	Simmons, Reading*	2,095
Reavel	2,198		

* Accepted.

WREXHAM.—For additions, &c., to workhouse, for the Union Guardians. Messrs. J. Morison & Son, architects, 10, King-street, Wrexham :—

Turner Bros.	£215 0 0	Davies Bros.	£205 10 0
Bates	209 10 0	Hulse, Chester*	153 7 10

* Accepted.

WREXHAM.—For addition and repairs to Grove Park Schools, Wrexham. Messrs. J. Morison & Son, architects :—

	Boys'.	Girls'.
Turner Bros.	£694 0 0	£241 0 0	£453 0 0
Davies Bros, Wrexham (accepted)	643 17 9	181 15 6	462 2 3
Henry Samuel	—	178 0 0	—
Badwick	—	125 16 0	—

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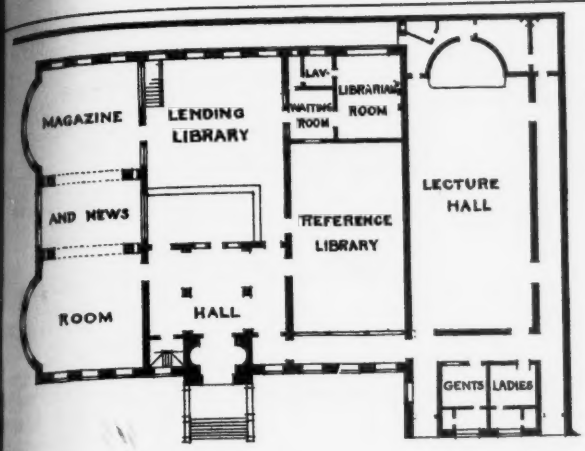

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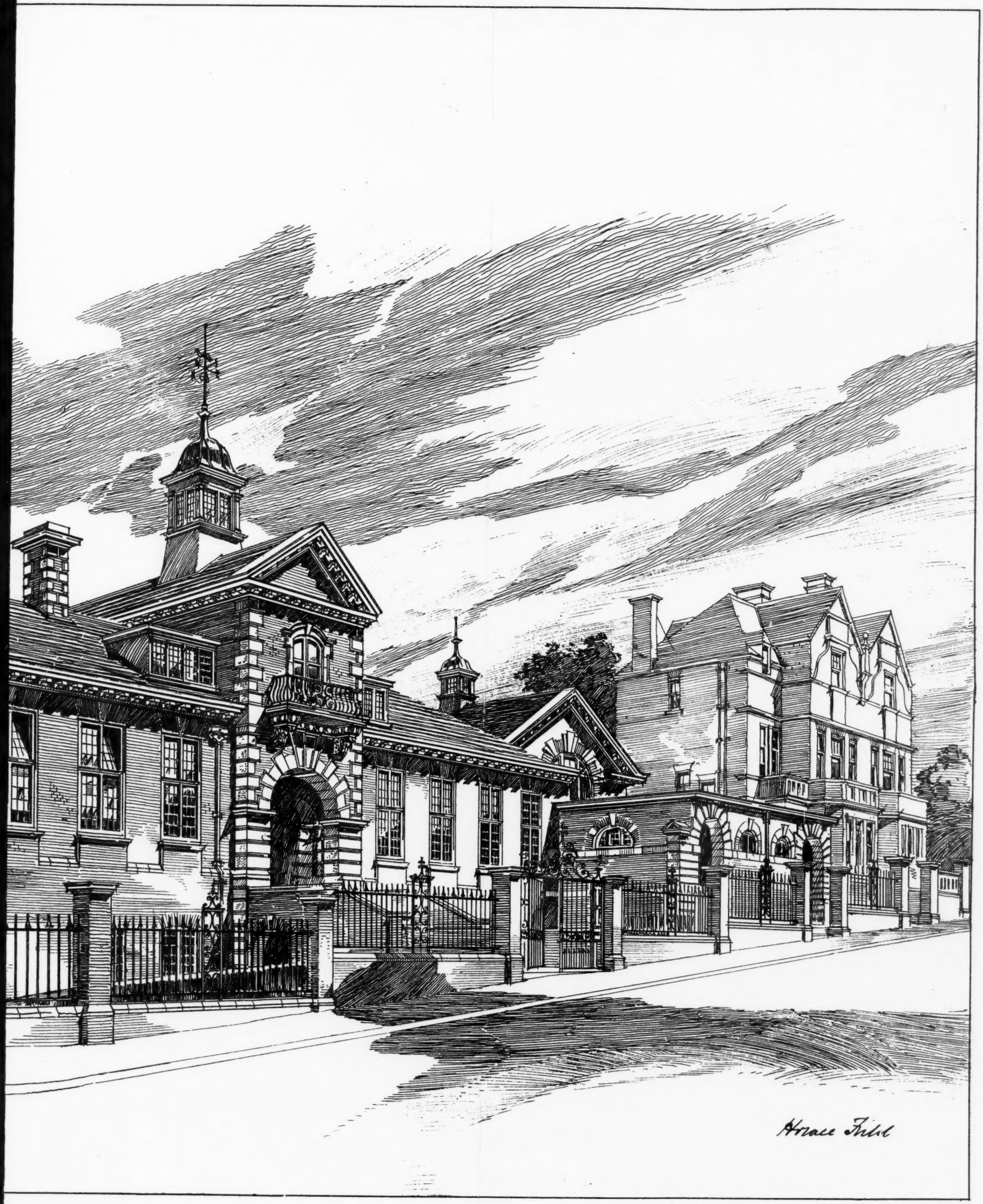

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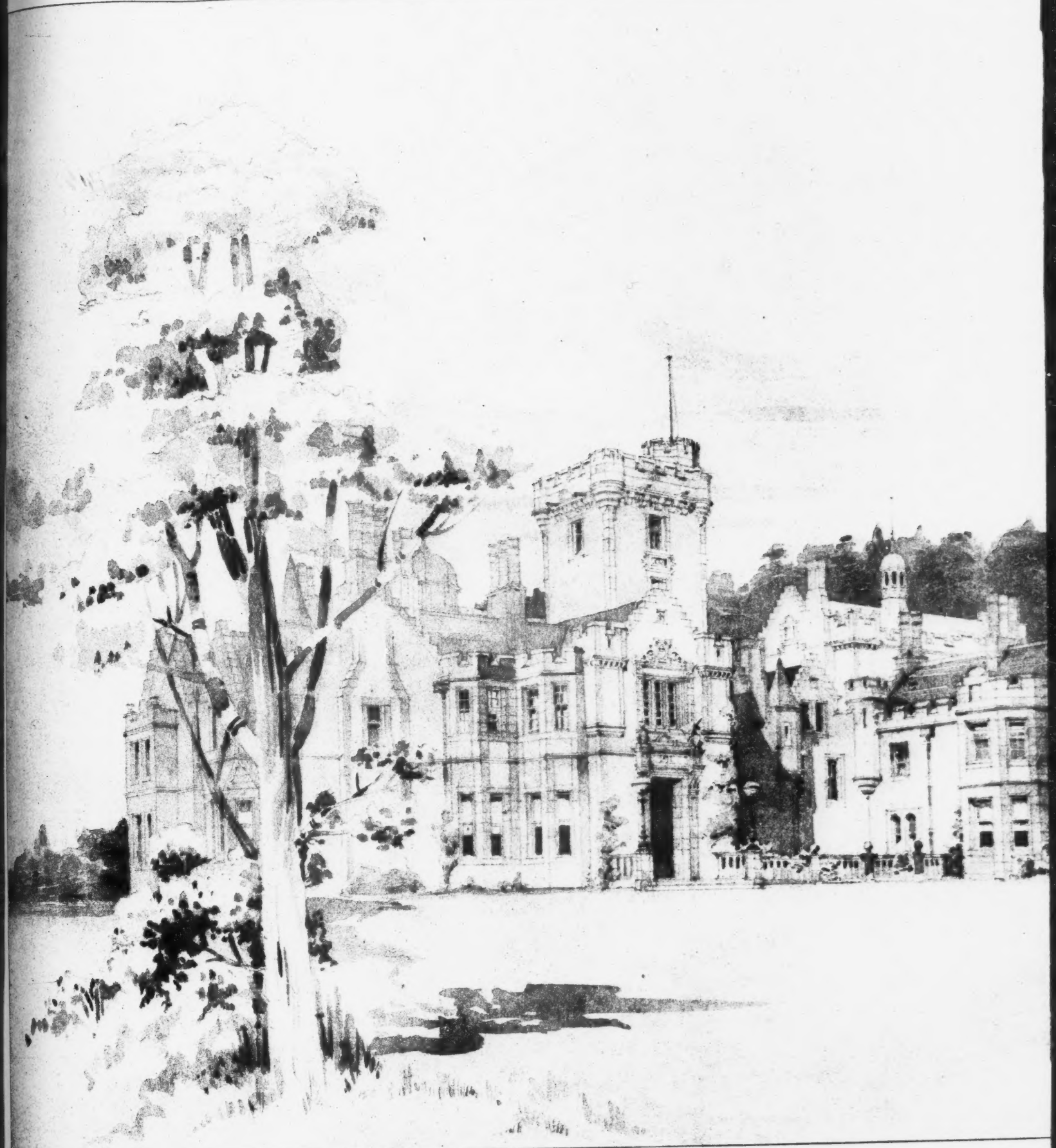

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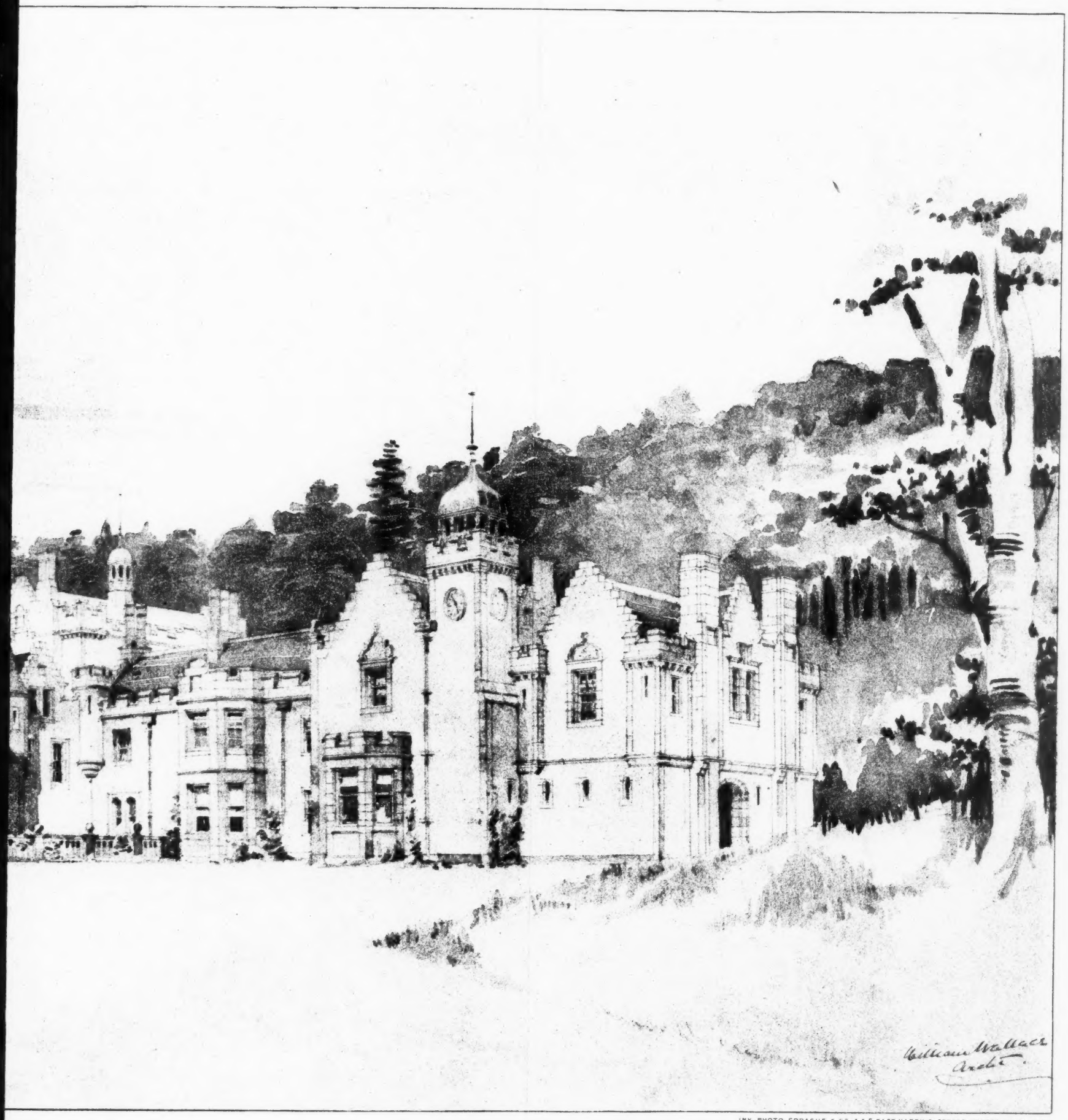

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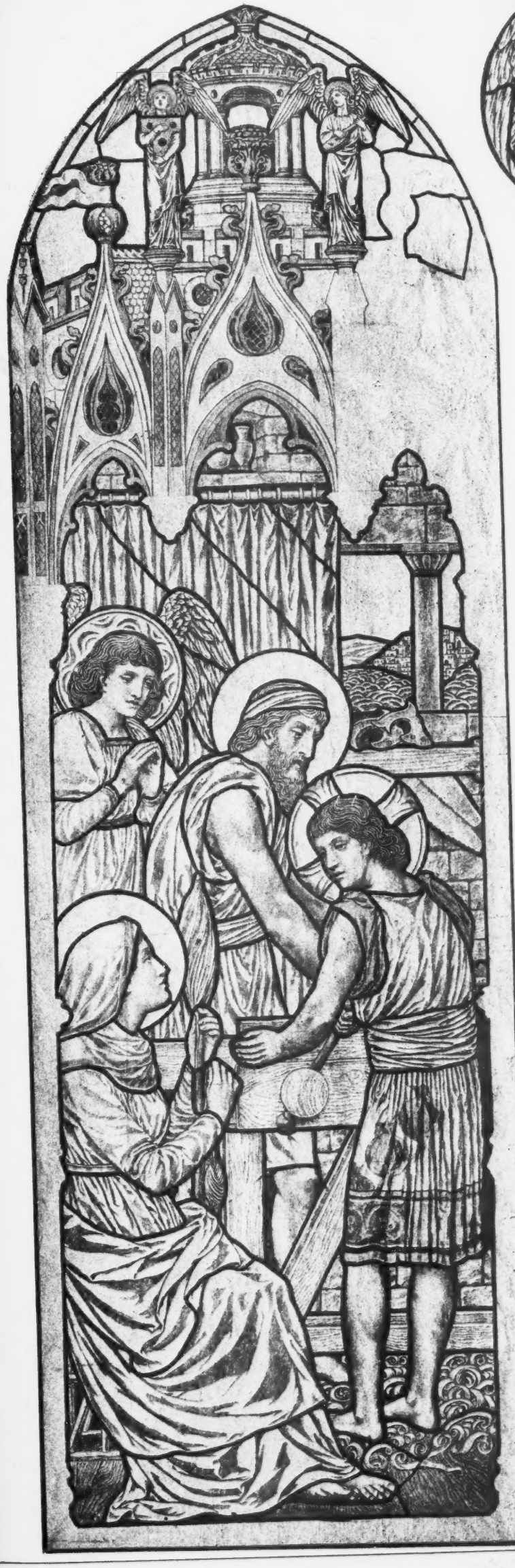

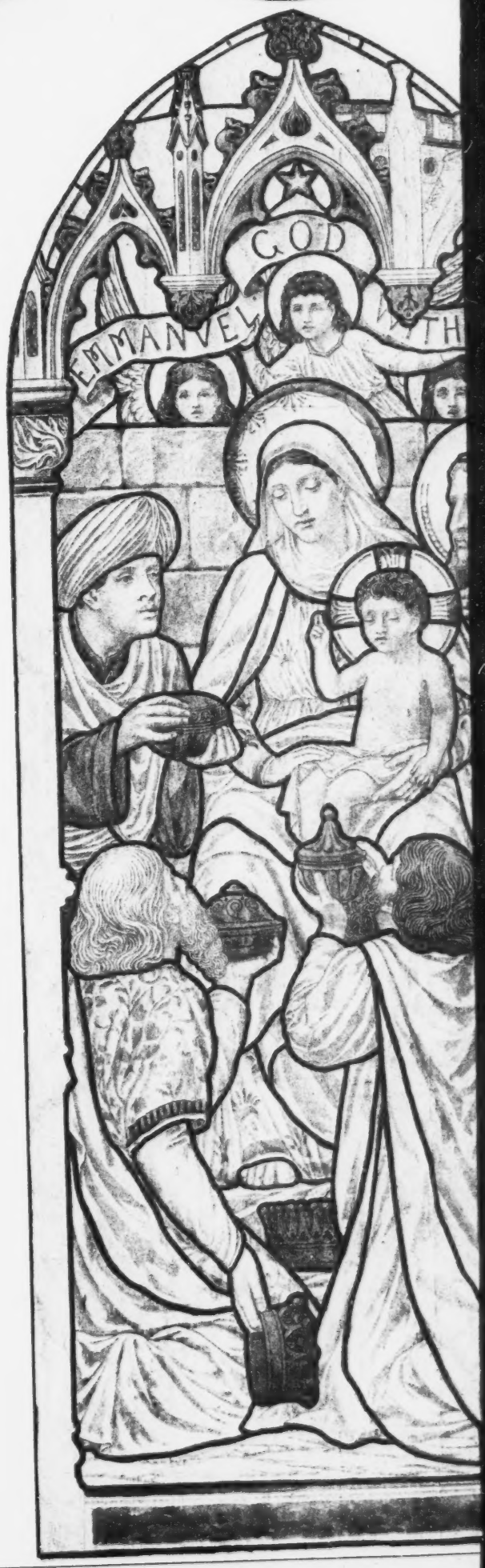

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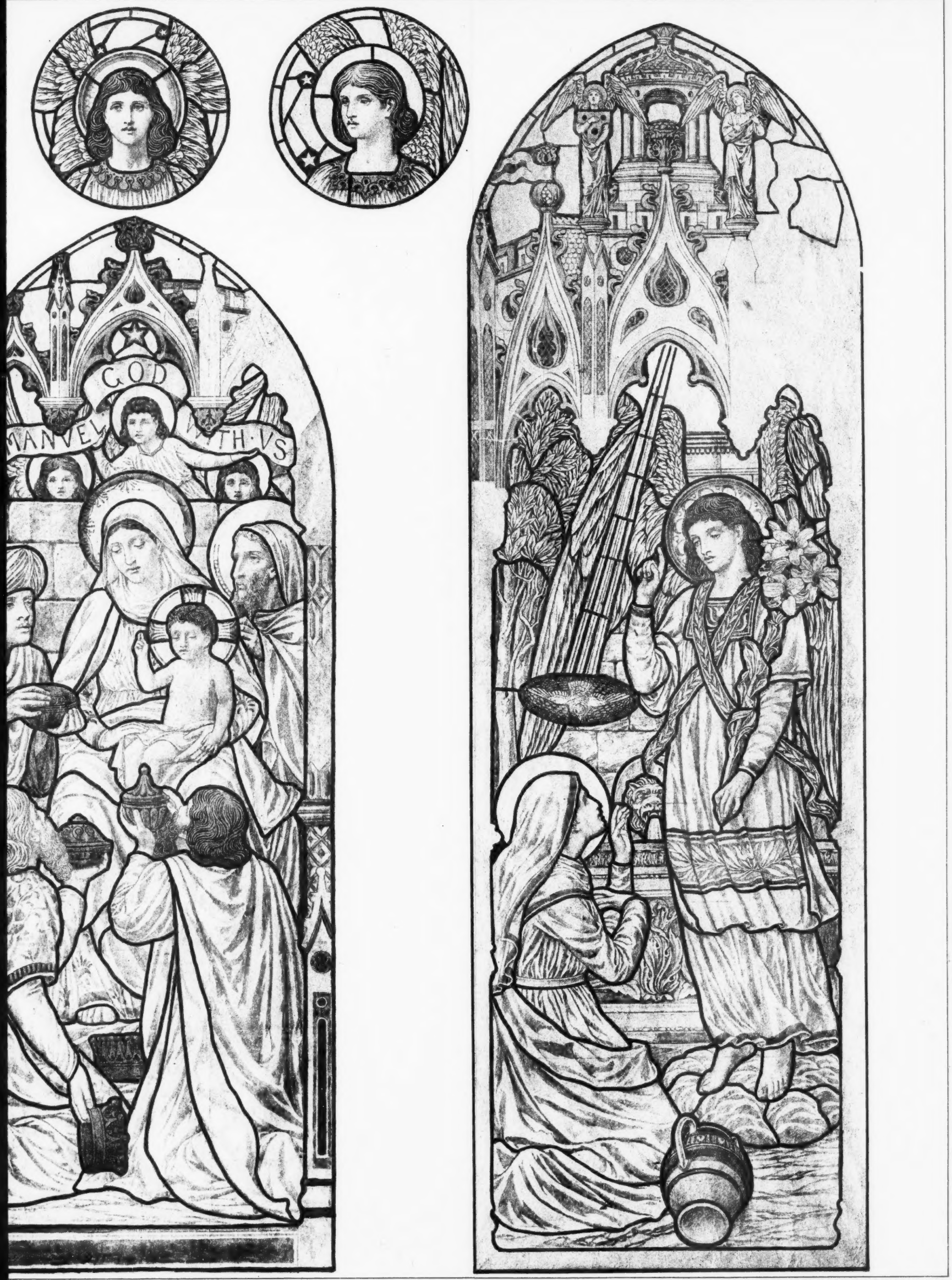

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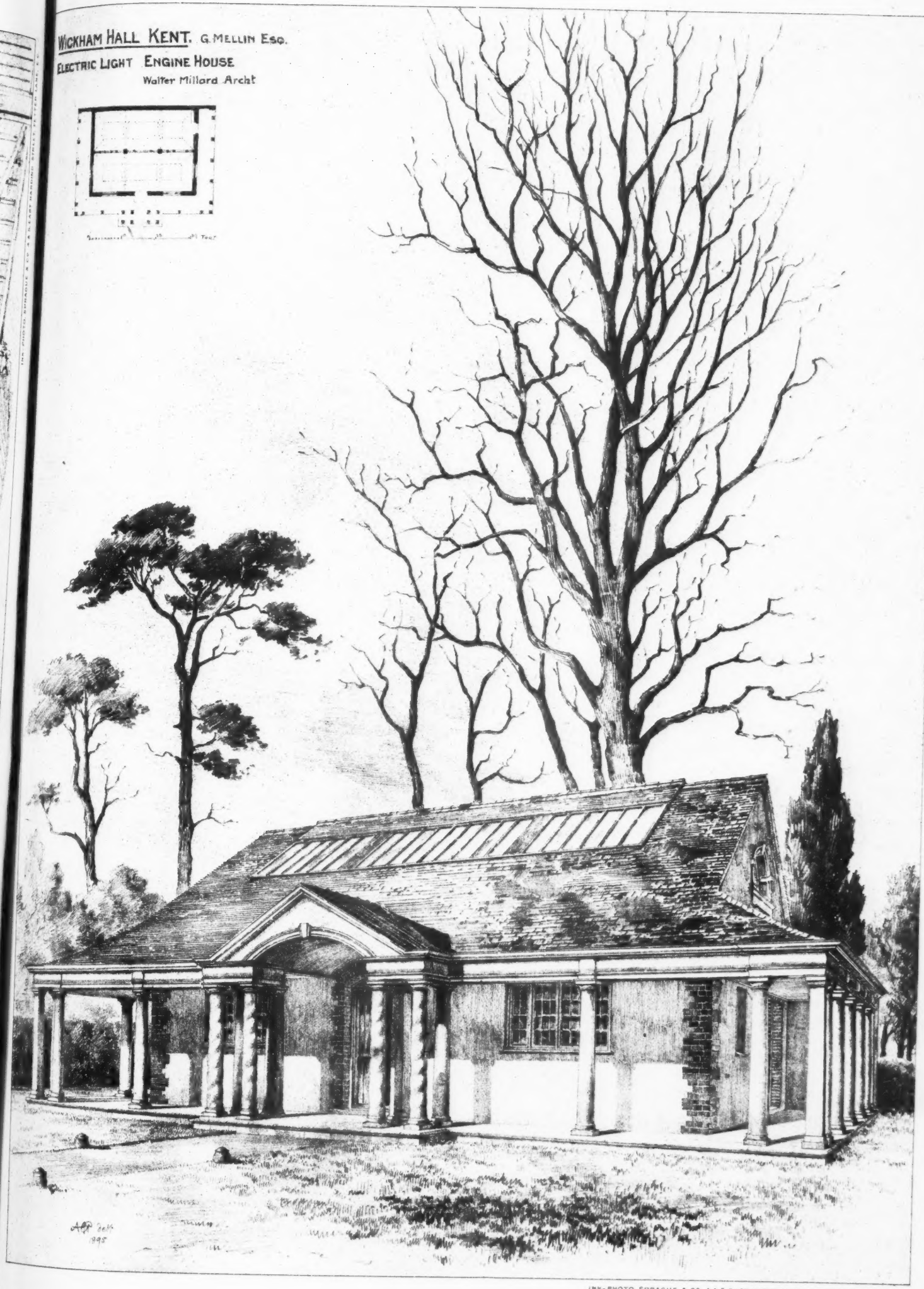

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